YAGUNOVA, V.A.; POPOV, K.V.

Certain diffucultiee connected with the theory of the hydrogen brittleness of steel. Issl.po zharopr.splav. 8:199-204 '62.
(MIRA 16:6)
(Steel—Brittleness)

YAGOL'SKAYA, L.

Dissertation: "Protection Potential of Some Metals Under Conditions of Cathodic Protection." Cand Chem Sci, Kiev State University, Kiev, 1953. (Referativnyy Zhurnal-Khimiya, No 9, Moscow, May 54)

SO: SUM 318, 23 Dec 1954

Yagupol'skaya, Lidiya Naumovna

FRANTSEVICH, Ivan Nikitich; CHERNOVOL, Vasiliy Semenovich; OKERMAN, Iosif Samoylovich; PILIPENKO, Nina Alekseyevna; YAGUPOL'SKAYA, Lidiya Naumovna; ZIL'BAN, M.S., redaktor; FEDORCHENKO, I.M., doktor tekhnicheskikh nauk, redaktor; RAKHLINA, N.P., tekhnicheskiy redaktor

[Over-all electric controlling of corrosion in the Dashava - Kiev gas pipe line] Kompleksnaia elektrozashchita gazoprovoda Dashava - Kiev ot korrozii. Kiev, Izd-vo Akademii nauk USSR, 1955. 30 p. (MLRA 9:3)
(Corrosion and anticorrosives) (Gas, Natural--Pipelines)

GERENROT, I.S.; YAGUPOL'SKAYA, L.N.

Use of wind motors for stations of cathodic protection on the Dashava-Kiev gas pipeline. Gaz.prom.no.3:32-34 Mr '56.
(MLRA 10:1)

(Gas, Natural--Pipelines) (Wind mills)

YAGUPOL'SKAYA, L.N.

SOV 125-58-3-5/15

AUTHORS: Langer, M.A., Rozenberg, O.O., Vesker, L.Ye., and Yagupol'skaya, L.N.

TITLE: Corrosion Resistance of "22K"-Steel Weld Joints (Korrozionnaya stoykost' svarnykh soyedineniy stali 22 K)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 3, pp 33-41 (USSR)

ABSTRACT: Both Soviet and foreign scientists, such as G.V. Akimov, B.M. Parking, V.N. Noyev, N.D. Sobolev and L.A. Glikman, have been concerned with the problem of cracks in boilers for some time. The Electric Welding Institute imeni Paton carried out corrosion tests of electric-slag and multilayer welded "22K"-steel specimens, put into a solution of nitrate salts (45% $Ca(NO_3)_2$ and 35% NH_4NO_3 plus water), which was recommended by Zemon and had been successfully used by S.G. Vedenkin. The authors come to the conclusion that electric-slag welded joints have a higher resistance to caustic brittleness than multilayer welded joints. Seam cracks have a crystallite character and occur near the fusion line. Measurements of electrode potential of weld surfaces, showed that the potential is distributed uniformly in electric-slag welded joints, but drops sharply in the zone of thermal influence in joints made by automatic multilayer welding.

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Corrosion Resistance of "22K"-Steel Weld Joints SOV 125-58-3-5/15

There are 2 figures, 3 tables, 2 graphs, 4 photos and 11 references, 8 of which are Soviet, 2 English and 1 German.

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki imeni Ye.O. Patona AN USSR (Electric Welding Institute imeni Ye.O. Paton AS UkrSSR, Bearer of the Labor Order of the Red Banner)

SUBMITTED: July 1, 1957

1. Welds--Corrosion 2. Welds--Test results

Card 2/2

125-58-6-4/14

AUTHORS: Yagupol'skaya, L.N., Langer, N.A., and Gurevich, S.M., Candidates of Technical Sciences

TITLE: Corrosion Resistance of Titanium Welds in Hydrochloric, Sulfuric and Nitric Acids (Korrozionnaya stoykost' svarnykh shvov titana v solyanoy, sernoy i azotnoy kislotakh)

PERIODICAL: Avtomaticheskaya Svarka, 1958, Nr 6, pp 42-50 (USSR)

ABSTRACT: Butt welds of technically pure "VT1" titanium of 3.0 mm thickness, welded under "AN-T1" flux with 2.5 mm titanium electrode rods, were tested in water solutions of sulfuric, hydrochloric, and 60% and 99 % nitric acids. Tests in liquid and gaseous 99% HNO_3 were carried out with unloaded and with stressed specimens. Results are shown in tables and schematic drawings. The following conclusions are made: 1) titanium welds, tested under the aforementioned conditions, have the same corrosion resistance as the base metal; 2) commercial titanium and its weld joints are prone to corrosion cracks under tension in gaseous 99% HNO_3. There are 6 tables, 3 photos, 2 graphs, 2 figures, and 16 references, 8 of which are Soviet, 6 English, 1 French, and 1 German.

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125-58-6-4/14

Corrosion Resistance of Titanium Welds in Hydrochloric, Sulfuric and Nitric Acids

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut Elektrosvarki imeni Ye.O. Patona AN UkrSSR(Order of Labor "Red Banner" Institute of Electric Welding im. Ye. O. Paton, AS UkrSSR)

SUBMITTED: February 21, 1958.

AVAILABLE: Library of Congress

Card 2/2 1. Titanium-Welding 2. Welds-Corrosion resistance 3. Acids-Applications

18(7) SOV/125-59-8-6/18

AUTHORS: Rabkin, D.M., Langer, N.A., Yagupol'skaya, L.N., and Pokhodenko, V.D.

TITLE: On Methods of Corrosion Testing of Welded Joints of Aluminum in Nitric Acid

PERIODICAL: Avtomaticheskaya svarka, 1959, Nr 8, pp 49-56 (USSR)

ABSTRACT: The article deals with methods of testing corrosion resistance of welded joints of aluminum. The authors wish to ascertain the character of the action of nitric acid in relation to its concentration and temperature, and more precisely define the necessary preparation of surface of samples and other experimental conditions in order to work out the most acceptable accelerated method of testing welded joints of aluminum in nitric acid. The authors open with a review and critique of other work in this field, including that of V.P. Batrakov [Ref 1], V.A. Savchenko [Ref 7], and F.B. Slomyanskaya and A.N. Krutikov [Ref 10], but they find a comparison difficult because the methods used varied. A method of testing welded joints of aluminum, worked

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On Methods of Corrosion Testing of Welded Joints of Aluminum in Nitric Acid

out by NIIKhIMMASh - boiling test samples in concentrated nitric acid for a long period of time (100-200 hrs)- is criticized as having poor reproducibility of results. The experiments described in this article were performed on type A1 aluminum of the following composition: 0.20% Fe, 0.20% Si, $\leq$ 0.01% Cu, the rest - aluminum. Sample dimensions were 70x30x4 mm; seam width was 12-14 mm. Nitric acid in concentrations of 10, 20, 30, 40, 50, 60, 70, 80% by wt. were used. Further particulars are contained in the text. The following conclusions were reached on the basis of the experiments: 1) the highest rate of corrosion was attained using 30% HNO_3; for accelerated corrosion testing it is recommended that boiling 50% HNO_3 be used; 2) corrosion speed in 50% HNO_3 was determined as a function of time (Fig 1). the curve of this function levels out 2 hours after the start of the test; 3) tests in 50% HNO_3 guarantee a higher reproducibility of results in comparison with tests in concentrated

acid; in addition the character of the corrosion damage is preserved. The condition of the surface of the samples was found to have a comparatively small effect on the rate of corrosion (Fig 3). Further tests were carried out for comparative evaluation of the corrosion resistance of welded joints; a) boiling samples in 98% HNO_3, for 100 hours, and b) by the accelerated method, i.e. two-hour boiling in 50% HNO_3. Samples with three types of welds were used. Samples were compared by weight in arriving at a criterion for corrosion resistance. Results are tabulated (Table 3). Results of the 100-hour test in 98.3% HNO_3 support known data to the effect that identical samples in the same acid and under similar testing conditions give poorly corresponding results. However, good reproducibility of results was obtained in the 2-hour tests with 50% HNO_3. In addition, structure and defects in the seam show up better after the two-hour test. Weight criterion of the corrosion resistance should be supple-

On Methods of Corrosion Testing of Welded Joints of Aluminum in Nitric Acid

mented by visual inspection of the seam. There are 2 photographs, 3 graphs, 5 tables, and 13 references, 9 of which are Soviet, 2 English, 1 German, and 1 Czech.

ASSOCIATION: Ordena trudovogo krasnogo znameni - Institut elektrosvarki imeni Ye.O. Patona AN USSR (Order of the Red Banner of Labor - Institute of Electric Welding imeni Ye.O. Paton, AS UkrSSR)

SUBMITTED: April 10, 1959

18(2,3,7) SOV/125-59-10-3/16

AUTHOR: Gurevich, S.M., Candidate of Technical Sciences, and Yagupol'skaya, L.N., Candidate of Chemical Sciences

TITLE: The Mechanical Properties and Corrosion Resistance in Nitric Acid of Welded Joints of Certain Titanic Alloys

PERIODICAL: Avtomaticheskaya svarka, 1959, Nr 10, pp 19-30 (USSR)

ABSTRACT: The purpose of the tests described in the article was to determine the mechanical properties and corrosion resistance of welded joints made from titanic alloys of Types VT3-1, VT4, OT4 (two-phase), VT5 and VT5-1 (single phase), which are new in general use [Refs 1 and 2]. In an experiment to compare the corrosion resistance of the alloys and their welded joints, sheet metal 3-3.5mm thick was taken and tests were conducted on butt-joints by means of various alloys and electrode wire 2.5mm in diameter; the welding process was as follows: I_{sv} = 200-250 amps, U_d = 30-32 volts, V_{sv} = 50 m/hour. Table 1 illustrates the data concerning the chemical composition and mechanical properties of the alloys tested. It was found that the metal of the seam welded with the alloy VT3-1 was the most durable at a normal temperature and softened

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least at high temperatures (Fig 2), while joints made with the alloys VT5-1 and OT4 were of the maximum elasticity (Table 2). Graphs of the mechanical properties of the metal of the seams under various temperatures are given in Fig 1. The toughness of the alloys (given in Fig 2) was found to be virtually invariable at a normal temperature, but at low temperatures (-70° C) that of the alloys VT5 and VT5-1 decreased (to 2.3-2.5 kilogrammeter/cm^2) more than in the case of the alloys OT4 and VT4 (4 kilogrammeter/cm^2). Table 3 contains the results of tests on the mechanical properties of welded butt-joints carried out on 10mm thick metal by means of Type VT-1 titanic wire 3mm in diameter, with flux Type AN-T1; it can hence be seen that the tendency of single-phase seams to friability is due to their greater sensitivity to hydrogen. It is stated that the resistance to friability of titanic seams may be raised by the addition of molybdenum [Ref 5]. Fig 4 shows microstructures of 2 seams, one single-phase alloy Type VT5-1 and the other two-phase alloy

The Mechanical Properties and Corrosion Resistance in Nitric Acid of Welded Joints of Certain Titanic Alloys

Type VT3-1, for purposes of comparison. Corrosion tests in 99% HNO_3 were then conducted on test-pieces of the above-mentioned alloys and joints, with flux Type AN-T1 and electrode wire Type VT-1, at a temperature of 50°C. The test-pieces were of 2 kinds - unloaded, dimensions 50 x 25 x 2-3.5mm, and under pressure, dimensions 150 x 15 x 2-3.5mm (see Fig 5)- and were subjected to pressure equal to 80° of the yield point of the alloy or joint. The experiments, which were carried out in liquid and gaseous HNO_3, showed that neither kind of test-piece underwent any corrosive effects in 99% liquid HNO_3, loss of weight being nil, and the results of tests in gaseous HNO_3 are given in Table 4; in this case all the alloys tested, including titanium, were subject to corrosion. Fig 5 shows a general view of a welded test-piece of VT5 alloy after being tested in 99% gaseous HNO_3 (the crack appearing along the welded seam), while a test-piece of VT5 alloy, tested under similar

The Mechanical Properties and Corrosion Resistance in Nitric Acid of Welded Joints of Certain Titanic Alloys

conditions, is shown in Fig 6 for comparison. Polarization curves were set up in order to throw light on the corrosive processes in titanium and its alloys. The system described in Ref 9 was somewhat altered, and as an example Fig 7 gives cathode and anode polarization curves for 99% liquid HNO_3 on technical titanium and the alloy VT3-1, indicating that a protective film is formed on the test-pieces, preventing the cathode process from reaching them, while in the case of gaseous HNO_3 considerable cathode polarization is to be observed. The author closes with an appeal for further research on this subject, and sums up the main points of the article. There are 4 tables, 3 graphs, 1 diagram, 3 photographs, and 10 references, 9 of which are Soviet and 1 American.

ASSOCIATION: Ordena trudovogo krasnogo znameni institut elektrosvarki imeni Ye.O. Patona AN USSR (Order of the Red Banner of Labor Institute of Electric Welding imeni Ye.O. Paton AS UkrSSR)

The Mechanical Properties and Corrosion Resistance in Nitric Acid of Welded Joints of Certain Titanic Alloys

SOV/125-59-10-3/16

SUBMITTED: April 10, 1959.

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18(7)

SOV/125-60-1-10/18

AUTHOR: Rabkin, D.M., Yagupol'skaya, L.N., Pokhodenko, V.D., Langer, N.A.

TITLE: On the Problems of Accelerated Corrosion Tests of Welded Aluminum Joints in Nitric Acid

PERIODICAL: Avtomaticheskaya svarka, 1960, Nr 1, pp 74-78 (USSR)

ABSTRACT: In their previous work [Ref 1] the authors showed that 50% nitric acid can be used for the accelerated testing of aluminum welds for corrosion resistance. Boiling for two hours in such an acid concentration ensures better results than tests with concentrated nitric acid. The optimum sizes of test samples are determined and the accelerated test method is explained. The size of the samples can considerably influence the results of the tests. Table 1 and graphs 1 and 2 show test results depending on the size of samples. The latter were tested for two hours in boiling 50% nitric acid. Figure 3 shows samples of different length after the tests. As the ratio of the area of the basic metal in the

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On the Problems of Accelerated Corrosion Tests of Welded Aluminum Joints in Nitric Acid

sample increases in relation to that of the weld, the mean rate of corrosive destruction gradually drops. To determine the influence of the size of the butt end surfaces on corrosion of the welded joint, different thicknesses of the latter were tested. The results of these tests are given in table 2. Experiments were made by putting samples straight into boiling acid, and by putting them into cold acid and then bringing it up to the boiling point. The average rate of corrosive destruction depending on these two conditions is shown in table 3. On the basis of investigations, the results of which are described in the previous work [Ref 1] and in this article, and after consideration of the results of tests conducted at plants, an industrial test method was developed. It includes instructions for the preparation of samples, the tests themselves and the methods of evaluating results. The method has been tried at a number of

On the Problems of Accelerated Corrosion Tests of Welded Aluminum Joints in Ntric Acid

plants where it received approval. It can be used for testing the welded parts of chemical equipment for corrosion by nitric acid. The authors thank engineer Ivleva (Penzkhimmash), S.V. Shimanskaya, V.G. Labetskiy (zavod "Krasnyy Oktyabr'") ("Krasnyy Oktyabr'" Plant) and Kuramzhin (Uralkhimmash) for their aid in developing the method. There are 1 diagram, 2 graphs, 1 photograph, 3 tables, and 2 Soviet references.

ASSOCIATION : Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im Ye.O. Patona AN USSR (Order of the Red Banner of Labor Institute of Electric Welding imeni Ye.O. Paton AS UkrSSR).

SUBMITTED: 1 July 1959

25(1)

S/125/60/000/03/010/018
D042/D001

AUTHORS: Medovar, B.I. and Yagupol'skaya, L.N.

TITLE: Corrosion Destruction of Butt Welds in Pipes of Stainless 17% Chromium Steel

PERIODICAL: Avtomaticheskaya svarka, 1960, Nr 3, pp 70-74

ABSTRACT: The article describes a case of corrosion breakdown of a coil pipe at a nitric-fertilizer plant. The welded joints started to leak and corrosion could be observed on the body of the pipe on both sides of the joints. The defective joints were covered by unions, but the corrosion set in again. The Institute of Electric Welding imeni Ye.O. Paton investigated this case. It was stated that corrosion was caused on the outside of the pipe coil by the 50% nitric acid content when it was heated to 1100° C by the steam inside the coil. The corrosion in the base pipe metal was clearly intercrystalline. The nature of the revealed corrosion is discussed with references to foreign works /Ref. 1 Monypenny;

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D042/D001

Corrosion Destruction of Butt Welds in Pipes of Stainless 17% Chromium Steel

4, Lula, Lena, Kiefer/7 and two Soviet /Ref. 2, 3/. The following practical conclusions were made: "Kh17T" steel should be used and not "Kh17" (in steel with titanium the grain growth in welding is less than in "Kh17" steel). Secondly, if unstabilized steel is used, the welded joints must be subjected to local heat treatment. At the nitric-fertilizer plant both mistakes were committed and unstabilized austenite electrodes were used. The coil pipes of steel "Kh17" can be welded with electrodes "EF17" (GOST 2523-54), i.e. "Kh17" wire, or with austenite "EA1" electrodes which give a stabilized weld metal with a two-phase austenite-ferrite structure resistant to intercrystalline corrosion. Electrodes of "OKh18N9F2C" wire (EI606) or "OKh18N9FBC" wire (EI649) can also be used. In the first case (electrodes EF17), a local heat treatment of the butt welds (e.g. blowpipe) is necessary; in the second case it

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Corrosion Destruction of Butt Welds in Pipes of Stainless 17% Chromium Steel

is not mandatory, as the speed of intercrystalline corrosion in the heat-affected zone is comparatively not great. There are 1 diagram, 1 set of diagrams, 2 sets of photographs, 1 photograph, and 6 references, 3 of which are Soviet and 3 English.

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im Ye.O. Patona AN USSR (Order of the Red Banner of Labor Institute of Electric Welding imeni Ye.O. Paton AS UkrSSR).

SUBMITTED: October 21, 1959

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21909
S/125/60/000/011/004/016
A161/A133

18.8300 1138 1575 d&b 1416

AUTHORS: Yagupol'skaya, L.N., Gurevich, S.M.

TITLE: Corrosion of titanium alloy welds in mineral acids

PERIODICAL: Avtomaticheskaya svarka, no. 11, 1960, 18-24

TEXT: The Electric Welding Institute has studied the corrosion behavior of five titanium alloys in sulfuric and hydrochloric acid. The alloys were: ВТ5-1 (VT5-1), titanium-aluminum-stannum ОТ -4 (OT-4), titanium-aluminum-manganese; Т -3 and Т -4 (T-3 and T-4), titanium-iron-chrome-aluminum-silicon; and ИМП -7 (IMP-7), titanium-aluminum-vanadium. The IMP-7 was a powder metal, the others were produced by arc melting in a vacuum furnace. Metal of up to 2 mm depth was welded by the argon arc method; alloys of 2.5-3 mm depth by submerged arc under АН -Т1 (AN-T1) flux, with ВТ1 (VT1) wire. Corrosion test specimens were strung on a plastic pipe and isolated by porcelain beads. The corrosive medium were sulfuric and hydrochloric acid solutions of various concentration. For prolonged tests hydrochloric acid concentrations of 1, 3.5, and 5% were used (7% solution destroyed titanium alloys rapidly). The

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Corrosion of titanium alloy welds...

selected concentrations of sulfuric acid are the most characteristical - 5% and 40% causing considerable destruction of commercial titanium, and 60% in which titanium and titanium welds are corrosionproof (Ref.6). The tests lasted 100 hours. The results are illustrated in diagrams (Fig.2 and 3), from where it can be seen that in sulfuric acid solutions the resistance of welds and base metal is nearly equal, and in hydrochloric acid the corrosion rate of welds is slightly higher than that of base metal. No changes were revealed in the crystalline structure of welds or base metal from the corrosion tests. The corrosion-resistance of welds made by the argon arc and submerged arc process was practically equal. All five alloys proved corrosion resistant with a corrosion rate of less than 0.13 mm/year in 1-% hydrochloric acid solution at 50°C; a concentration increase to 3.5 and 5% caused a much higher corrosion rate in alloys, but not in commercial titanium which remained resistant. In 5-% sulfuric acid the corrosion rate of the alloys was high and differed not very much, but commercial titanium corroded 2-2.5 times faster than the alloys. In 60-% sulfuric acid all alloys and welds were satisfactorily resistant. The different behavior of commercial titanium and titanium alloys is explained by different formations of protective surface films. There are 5 figures and 10 references: 8 Soviet and 2 non-

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21909
S/125/60/000/011/004/016
A161/A133

Corrosion of titanium alloy welds...

Soviet.

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im.Ye. O.Patona AN USSR ("Order of the Red Banner of Labor" Electric Welding Institute im.Ye.O.Paton of the Academy of Sciences of the UkrSSR)

SUBMITTED: April 14, 1960

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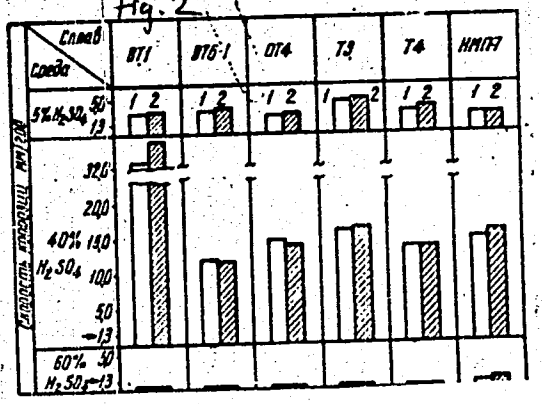
S/125/60/000/011/004/016
A161/A133

Corrosion of titanium alloy welds...

Figure 2:

Corrosion rate of titanium alloys and their welds in sulfuric acid, in mm/year (the arrow shows the boundary of corrosion resistance)
1 - base metal; 2 - weld metal

Fig. 2



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Corrosion of titanium alloy welds...

Figure 3:

Corrosion rate of the same alloys in hydrochloric acid

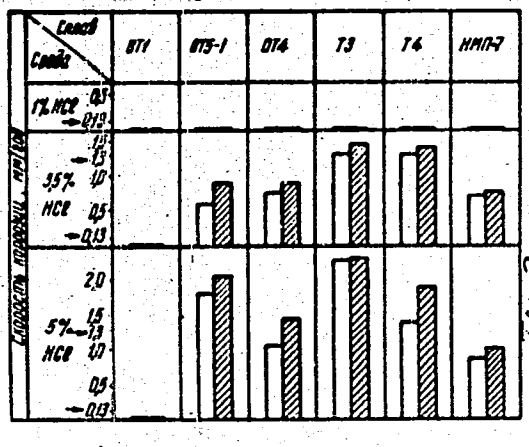

Fig. 3

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84675

S/020/60/134/006/021/031
B016/B067

5.3700 2209, 1318, 1312 only

AUTHORS: Yakupol'skiy, L. M. and Yagupol'skaya, L. N.

TITLE: Electron Nature of the Fluorine-containing Substituents

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 6, pp. 1381-1383

TEXT: The authors found that the physicochemical properties of several aromatic fluorine compounds (except for those substituted with fluorine atoms, and for trifluoro methyl derivatives of benzene) have not been investigated. They first determined the pK_a of the corresponding benzoic acids. For this purpose they measured the pH of the aqueous-alcoholic solutions half-neutralized with titrated NaOH solution. The pH was measured by means of a tube potentiometer ЛП-5 (LP-5) with glass electrode at 25°C. A saturated calomel electrode served as comparison electrode. Table 1 gives the results of the determination. To determine the constant ρ of the equation by L. P. Hammett (Ref. 2) $\log(k/k_0) = \rho\sigma$ the authors chose 5 substituents with exactly determined σ-constants and pK_a of the corresponding benzoic acids in aqueous ethanol. Besides

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Electron Nature of the Fluorine-containing Substituents

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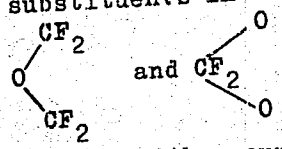
B016/B067

they used the data for pK_a and $\sigma = 0$ of the non-substituted benzoic acids. For calculating ρ only the pK_a of the m-derivatives of benzoic acid were used. On the basis of these data and according to the method described in Ref. 3 it was found that $\rho = 1.535$; the correlation coefficient r and the standard error s were also calculated. The substituents chosen by the authors satisfy R. W. Taft's conditions (Ref. 4). They were: H, m-Br, CH_3CO, CF_3, CH, SO_2CH_3, since in this case $\rho = 1.535$, $r = 0.998$, and $s = 0.03$. On the basis of ρ the σ constant of the new substituents in meta- and para-position were calculated. The cyclic groups



and

were ascribed to the p-series on the basis of the analogy with group

as well as with tetralin and hydrindene (Refs. 2,3). All substituents mentioned are electron acceptors or very weak electron donors. The dissociation constants of the acids mentioned are higher than those of benzoic acid, the values of the σ constants

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Electron Nature of the Fluorine-containing Substituents

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B016/B067

being positive. It appears from Table 1 that the trifluoro methyl sulfonyl group is the strongest electron-acceptor group among the known substituents in the benzene ring. p-trifluoro methyl sulfonyl benzoic acid is more than twice as strong as p-nitrobenzoic acid. This holds also for meta acids. Fig. 1 shows the dependence between the values of the σ constants and log k of substituted benzoic acids in 50% aqueous ethanol. The authors compared the intensity and the orientating effect of some groups and they describe the positions in which individual compounds can be nitrated. There are 1 figure, 1 table, and 8 non-Soviet references.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk USSR (Institute of Organic Chemistry of the Academy of Sciences, UkrSSR)

PRESENTED: June 1, 1960, by V. N. Kondrat'yev, Academician

SUBMITTED: May 25, 1960

Card 3/3

27031
S/125/61/000/002/003/013
A161/A133

18.8300
1.2300

AUTHORS: Vabkin, D. M., Yagupol'skaya, L. N., Nikitina, A. F., Grabin, V. F.

TITLE: Effect of heat treatment on the corrosion resistance of AMg6 alloy and its welds

PERIODICAL: Avtomaticheskaya svarka, no. 2, 1961, 40-47

TEXT: The АМг6 (AMg6) alloy is an extensively used alloy that is corrosion-proof in air but not so in sea water. It is used in shipbuilding, apart from many other applications. It has been known for a long time that Al-Mg alloys with above 5% Mg are prone to sea water corrosion after hardening and aging, and the AMg6 can contain as much as 6.5% Mg. The described tests were carried out because of contradictory data in literature on the effect of heat treatment on such alloy grades. Two studied AMg heats had the following composition: 1) (%) 6.2 Mg, 0.70 Mn, 0.25 Fe, 0.25 Si, 0.14 Ti; 2) 6.5 Mg, 0.59 Mn, 0.05 Fe, 0.06 Si, 0.10 Ti. The welds were produced with an automatic argon arc process, with tungsten electrodes and filler wire of AMg6. The corrosion test solution was water with 3% NaCl + 1% HCl; tests were carried out at 20°C, for 24 and 48 hours, and the test techniques corresponding to those described by P. Brenner and W. Roth

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Effect of heat treatment on the corrosion ...

[Ref. 12: Recent developments in corrosion-resistant Al-Mg alloys. J. Institute of Metals, 74, 159, 1947). The results show that the corrosion rate rose abruptly after annealing at 125 - 225°C, then dropped, increased slightly in the 300 - 400°C range and decreased again at 500°C. The article includes photomicrographs made with an electron microscope. It was evident that metal subjected to the effect of high temperature (above 500°C) did not corrode, and that a second phase of peculiar appearance segregated on the grain boundaries in a continuous grid. Judging by the data of other investigations it was the β' phase that is instable and is converted into the equilibrium β-phase at higher temperatures. The β' phase has a higher negative potential than the solid Mg solution in Al and the usual β, and besides the solid solution loses Mg at its formation. The considerable potential difference in an electrolyte causes rapid decomposition of the boundary grid and a separation of whole grains from the metal. Apart from this, the behavior of metal appears to depend somehow on the state of the grain boundaries themselves, as this was noticed by F. Erdmann-Jesnitzer [Ref. 15: Interkristalline Korrosion und Korngrenzenaufbau, "Werkstoffe und Korrosion", 9 N., 1, 7, 1958]. It is concluded that the alloy tends to intercrystalline corrosion after 10-hours at 125-225°C, and long heating in this range must be avoided. There are 5 figures, 2 tables and 15 references: 12 Soviet-bloc and 3 non-

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A161/A133

Effect of heat treatment on the corrosion ...

Soviet bloc. Two references to English-language publications read as follows: F. M. Reinhart, G. A. Ellinger, Corrosion resistance of aluminum alloys, Light Metal Age, 14, N. 5-6, 16, 1956; P. Brenner, W. Roth, Recent developments in corrosion-resistant Al-Mg alloys. J. Institute of Metals, 74, p. 159, 1947.

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im. Ye. O. Patona AN USSR (Electric Welding Institute "Order of the Red Banner of Labor" AS UkrSSR)

SUBMITTED: June 15, 1960

X

Card 3/3

S/125/61/000/004/012/013
A161/A127

AUTHORS: Langer, N. A., Yagupol'skaya, L. N., Yushkevich, Z. V.

TITLE: On the method of investigating the tendency of welded joints to caustic embrittlement

PERIODICAL: Avtomaticheskaya svarka, no. 4, 1961, 86 - 87

TEXT: Brief information is given on a new method of caustic embrittlement tests requiring no special tension devices. Formerly, the Institut elektrosvarki im. Ye. O. Patona (Electric Welding Institute im. Ye. O. Paton) employed test specimens consisting of ribs welded to plates, and then the plates joined by butt welding, and later horseshoe-shaped specimens, or specimens loaded with a special device. Reference is made also to a recommendation of G. L. Shvarts and M. M. Kristal' to use a specimen 100 by 20 by δ (mm) in size, cut from welded plate with removed projections and loaded by the application of a bending or stretching force. The authors have used a method requiring no application of devices for the loading. Detailed information on the new technique will be published later in "Avtomaticheskaya svarka". The method consists in using welded plates 500 x 400 x δ (mm) in size and holding them in a boiling solution of 45% calcium nitrate and

Card 1/2

S/125/61/000/004/012/013
A161/A127

On the method of investigating the tendency of....

35% ammonium nitrate until the appearance of cracks. The solution is being conventionally used for testing the tendency of steel to caustic embrittlement. The article includes a photograph of a cracked specimen. Heat treatment had a high effect on the results of the tests, e.g. in one specimen that had not been heat-treated the crack appeared after 24 hours, in two others after 48 hours, and in a heat-treated specimen only after 240 hours. There is 1 figure..

SUBMITTED: January 16, 1960

Card 2/2

YAGUPOL'SKAYA, L.N.

Use of circular specimens for rapid corrosion tests of welded aluminum joints. Avtom. svar. 14 no.6:94 Je '61. (MIRA 14:5)
(Welding—Testing)

37668
S/125/62/000/004/006/013
D040/D113

12.1285
12300

AUTHORS: Gurevich, S.M., and Yagupol'skaya, L.N.

TITLE: Effect of some alloy elements on the corrosion cracking of welds in titanium alloys

PERIOCICAL: Avtomaticheskaya svarka, no. 4, 1962, 39-47

TEXT: Welds produced by the automatic process with argon shielding in 1.5-2 mm thick specimens of 41 different compositions of binary Ti-Sn, Ti-Zr and Ti-Mo alloys and their combinations with Al, Mn, Cr, V and Fe were tested for corrosion behavior under stress. A 99% nitric acid solution was used as a corrosive medium; stress was induced by bending close to the yield limit. The tests lasted up to 230 days. Details of tests and microscopic observations are given. Only Mo of all the tested alloy elements prevented the destruction of binary alloys. Additions of a third element as α-stabilizer (Al, Sn) or as β-stabilizer (Fe, Cr, V) eliminated the

Card 1/3

Effect of some alloy elements ...

effect of Mo. It is assumed that the anticorrosion effect of Mo is due to the formation of a peculiar and highly homogeneous fine-plate structure which resists corrosion much better than the coarse martensitic structure formed in metal alloyed with other elements. However, several Soviet specialists stated that the effect of alloying elements on the corrosion behavior of Ti could be explained either by the chemical stability of these elements and their presence in the protecting surface films, or by reduced anode effect. It was previously stated that Mo raised the resistance of welds in Ti to hydrogen embrittlement and cold cracking. Conclusions: (1) Alloying of titanium by zirconium or tin does not eliminate the tendency of alloys and welds to corrosion cracking under stress in 99% nitric acid; (2) binary Ti-Mo alloys and welds of such alloys have a high corrosion resistance under stress in such a medium; (3) the positive effect of Mo on the corrosion resistance of Ti welds is due to the peculiar structure of Ti alloyed with Mo. There are 6 figures and 4 tables.

Card 2/3

Effect of some alloy elements ... S/125/62/000/004/006/013
D040/D113

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im. Ye.O.Patona AN USSR (Electric Welding Institute "Order of the Red Banner of Labor" im. Ye.O.Paton, AS UkrSSR)

SUBMITTED: July 1, 1961

4

Card 3/3

3648

S/125/62/000/005/005/010
D040/D113

1.2200

AUTHORS: Langer, N.A., Yagupol'skaya, L.N., Yushkevich, Z.V., Koryagin, Yu.A. and Lebedev, B.F.

TITLE: Improving the corrosion resistance of low-carbon and low-alloy steel welds in an alkaline medium

PERIODICAL: Avtomaticheskaya svarka, no. 5, 1962, 36-43

TEXT: Since equipment used in the aluminum industry has to be frequently repaired because of caustic embrittlement of low-carbon and low-alloy steel, and since alternative steels cost too much, the effect of stress-relieving on the resistance of low-alloy steel welds to caustic embrittlement was studied, using a method described by T.W. Green and A.A. Holzbaur ("The Welding Journal", No. 3, 1946). The experimental equipment comprised a carriage with 4 gas burners producing a 120 mm-wide flame, and a water-cooling device 150 mm behind the flame. Five steel grades were tested. Calcium and ammonium nitrate solutions were used for corrosion tests. The electrode potential in specimens was measured. The experimental results show that the best ratio between Mn and C in the base

Card 1/3

metal was 1.7 : 3.0, and the highest potential was found in the 14Г2 (14G2) steel - 61 mv before heat treatment, and 30 mv after. The anode zone was always revealed directly at the welds and appears to be the result of stress concentration. It is presumed that caustic embrittlement of low-carbon steel in strong alkali solutions begins with the destruction of the protective surface film, and this process is most intensive in metal at welded joints, where the anode potential is highest, but weld defects such as pin holes, slag inclusions, or spills also cause stress concentration and anode potential. Conclusions: (1) Thermo-mechanical treatment considerably improved the resistance of low-carbon and low-alloy steels to caustic embrittlement; (2) welds in 19Г (19G), М16С (M16S) and Ст.3 (St.3) steels have better resistance to caustic embrittlement than М (M) and 14Г2 (14G2) steels; (3) the result of electrode potential measurements show that residual welding stresses intensify the anode processes in the weakness zone. There are 7 figures and 3 tables.

Card 2/3

S/125/62/000/005/005/010
D040/D113

Improving the corrosion resistance of low....

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im. Ye.O. Patona AN USSR (Electric Welding Institute "Order of the Red Banner of Labor" im. Ye.O. Paton, AS UkrSSR)

SUBMITTED: September 22, 1961

Card 3/3

LANGER, N.A.; YAGUPOL'SKAYA, L.N.; YUSHKEVICH, Z.V.; KORYAGIN, Yu.A.; LEBEDEV, B.F.

Effect of residual stresses on the corrosion resistance of welded equipment operating in alkali media. Vliian.rab. sred na svois. mat. no.2:87-96 '63. (MIRA 17:10)

L 25732-65 EWT(m)/EWA(d)/T/EWP(b)/EWP(k)/EWP(v)/EWP(t) IJP(c) WJW/JD/HM Pf-4

ACCESSION NR: AP3008443 S/0125/63/000/010/0090/0090

36
24
B

AUTHOR: Kharchenko, G. K.; Yagupol'skaya, L. N.

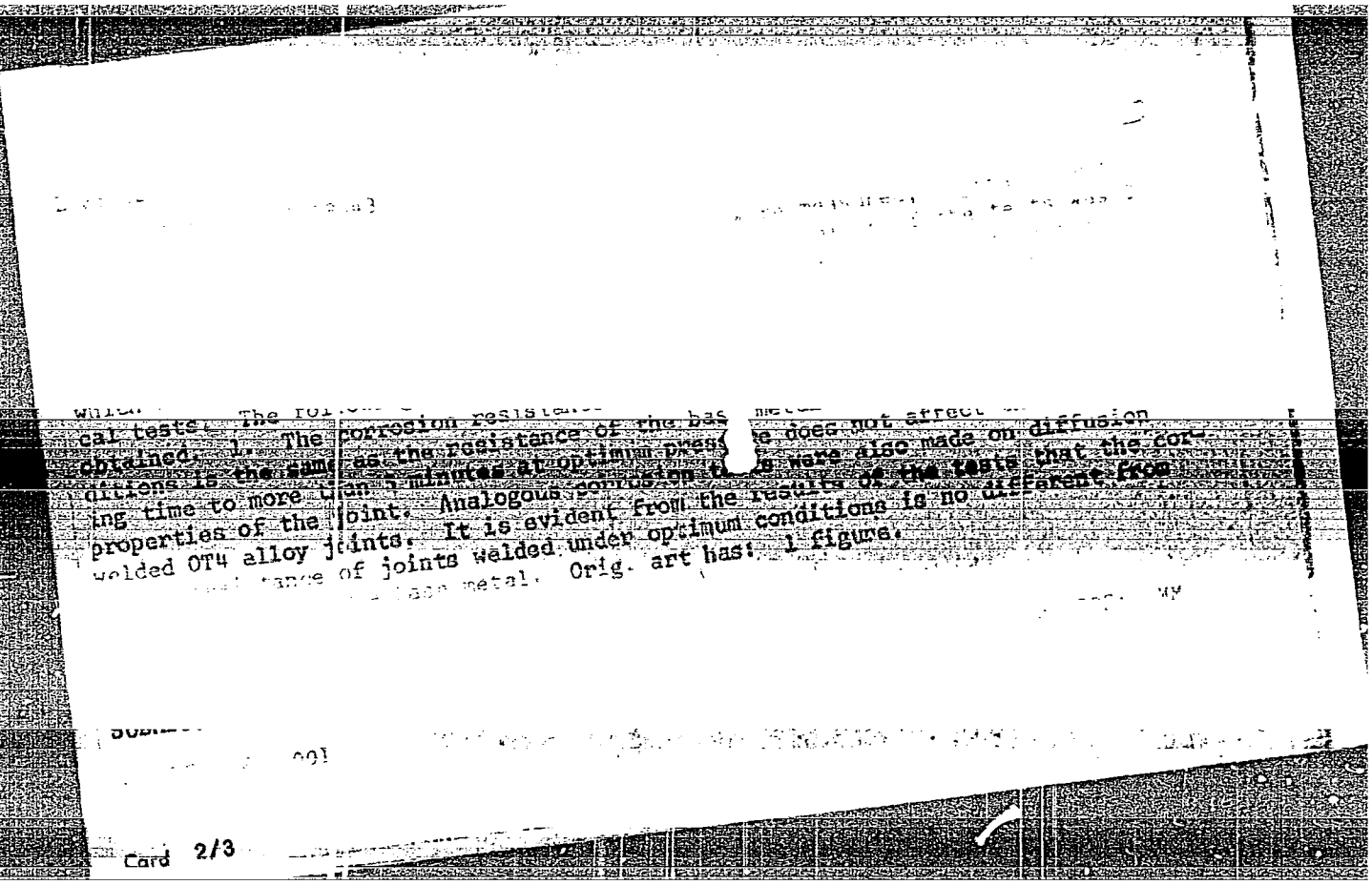
TITLE: On the corrosion resistance of diffusion welded titanium alloy joints

SOURCE: Avtomaticheskaya svarka, no. 10, 1963, 90

TOPIC TAGS: corrosion resistance, diffusion welding, welding evaluation, titanium alloy/ VT5-1 alloy, OT4 alloy

ABSTRACT: There are no data on the corrosion resistance of diffusion welded joints (made by pressure welding in a vacuum) in titanium alloys in the literature. The authors studied the corrosion resistance of VT5-1 and OT4 titanium alloy joints in a 5% solution of hydrochloric acid according to the method given in a [illegible] (L. N. Yagupol'skaya, S. M. Gurevich, Korroziya svarnykh soyedineniy [illegible] installation [illegible] "Avtomaticheskaya svarka," No 11, [illegible]

Card 1/3



cal tests. The ... corrosion resistance of the bas ... does not affect ... obtained. ... as the resistance at optimum pressing ... were also made on diffusion ... ditions is the same ... minutes at optimum ... tests of the tests that the cor- ... ing time to more ... joint. Analogous ... from the results of the tests ... properties of the ... welded OT4 alloy ... joints. It is evident ... conditions is no ... ance of joints welded under optimum ... base metal. Orig. art has: 1 figure.

Card 2/3

ACCESSION NR: AP3008443

ENCLOSURE: 01

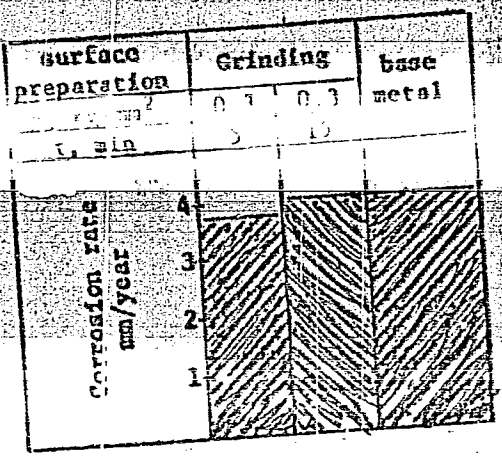


Fig. 1

YAGUPOL'SKAYA, L.N.; GUREVICH, S.M.

Corrosion of weldments of titanium and its alloys in inorganic chloride solutions. Avtom. svar. 16 no.1:44-47 Ja '63. (MIRA 16:2)

1. Institut elektrosvarki imeni Ye.O. Patona AN UkrSSR.
(Titanium—Welding) (Welding—Corrosion)

MAKARA, A.M.; YAGUPOL'SKAYA, L.N.; SLUTSKAYA, T.M.; KOP'YEV, M.I.; USHAKOV, I.S.; SMIRNOVA, V.A.

Resistance to hydrogen corrosion in alloyed steel joints made by electric slag welding. Avtom. svar. 16 no.6:24-29 Je '63. (MIRA 16:7)

1. Institut elektrosvarki im. Ye.O.Patona AN UkrSSR (for Makara, Yagupol'skaya, Slutskaya). 2. Gosudarstvennyy institut azotnoy promyshlennosti (for Kop'yev, Ushakov, Smirnova).
(Steel alloys--Corrosion) (Electric welding)

KHARCHENKO, G.K.; YAGUPOL'SKAYA, L.N.

Corrosion resistance of joints in titanium alloys made by diffusion bonding. Avtom. svar. 16 no.10:90 O '63. (MIRA 16:12)

LANGER, N.A.; YAGUPOL'SKAYA, L.N.

Electrochemical characteristics of welded joints in corrosive media. Avtom. svar. 16 no.12:61-67 D '63. (MIRA 17:1)

1. Institut elektrosvarki imeni Patona AN UkrSSR.

L 41246-65 EPA(s)-2/EWT(m)/EPF(c)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c)
Pf-4 IJP(c) JD/HM/JG/WB
ACCESSION NR: AP5009175 S/0125/64/000/011/0092/0093

AUTHOR: Gurevich, S. M.; Nefedova, I. D.; Yakupol'skaya, L. N.; Kamenskaya, Ye. A.

TITLE: Corrosion resistance of weld joints of titanium alloys containing 0.1 and 0.2% Pd

SOURCE: Avtomaticheskaya svarka, no. 11, 1964, 92-93

TOPIC TAGS: titanium, titanium alloy, palladium metal welding, corrosion resistance, hydrochloric acid

ABSTRACT: Owing to the naturally high corrosion resistance of titanium in many corrosive media its use in chemical machinery is continuously expanding. A great many investigations have been carried out in the last few years on the applications of titanium. The problem of further improving its corrosion resistance was solved by alloying it with various elements. It was found that palladium was one of the most effective additives. Addition of 0.1 to 0.2% palladium to titanium significantly increases the stability of the metal to [illegible] and hydrochloric acids as well as other media.

Card 1/4

L 41246-65
ACCESSION NR: AP5009175

Until recently no studies have been made of the behavior of welds made of such an alloy in agressive media, and furthermore there is little basis for recommending this alloy for welding chemical equipment.

The Institute of Electric Welding imeni Ye. O. Paton (Ukrainian Academy of Sciences) has investigated the corrosion resistance of welds made of titanium alloyed with 0.1 and 0.2% palladium, as well as type OT4 alloy containing 0.2% Pd in boiling dilute solutions of hydrochloric acid. Plates 1.5 mm thick were welded in an argon chamber with a nonconsumable electrode. The welding conditions were: I_w = 100 to 120 amp, U_d = 10 to 12 volts, V_w = [illegible] Test plates were 25 X [illegible] X 1.5 mm; test media were 1.0, 1.5, 2.5, and 5.0% solutions [illegible] should be noted that technical-grade titanium at 100°C is stable in hydrochloric [illegible] not exceeding 0.5%.

Alloying titanium with 0.1 to 2.0% Pd does not noticeably alter the structure of the seam. As for the base material, palladium in the studied quantities has little affect on the mechanical properties of weld joints: the yield point does not rise by more than 5 to 6% and the ductility remains the same as for unalloyed welds.

[illegible] resistance of welds with 0.1 and 0.2% Pd and their compounds was found to be high to boiling [illegible] 5 and 2% solutions of HCl

Card [illegible]

(not more than 0.04 mm/year). Type OT4 alloy with 0.2% Pd and its weld joints are stable only to a 1% boiling solution of HCl; in a 1.5, 2.0 and 2.5% solution of HCl the corrosion rate reaches 0.2 mm/year. Alloys with 0.1 and 0.2% Pd are stable in a 2.5% boiling HCl, but their weld seams are less stable because of the preferential dissolution of the metal in the seam and heat affected zone. A boiling 5% solution of HCl deteriorates the alloys and their weld joints still more, and the latter to an even greater degree. It should be noted in the corrosion tests made on the alloys and their weld seams in boiling 2.5 and 5% HCl that in many cases the corrosion rate is not duplicated in identical samples. Thus, we may say that titanium alloys with 0.1 and 0.2% Pd and their weld joints are resistant to boiling solutions of hydrochloric acid of up to 2% concentration. In 2.5% HCl solutions these alloys maintain their passive state, which in individual instances breaks down. In 5% solutions of HCl weight losses are greater and the breakdown of the passive state is observed more frequently.

The OT4 alloy with 0.2% Pd is resistant only to boiling 1% HCl; a further increase in concentration accelerates corrosion appreciably. In active corrosion processes of weld joints, a deterioration of the weld metal is observed primarily in the heat-affected zone. This indicates that 0.1 and

ACCESSION NR: AP5009175

0.7% Pd in the weld, having a coarse-grain structure of the cast metal, is [illegible] ed alloy. Special measures mus[illegible]

[illegible] the alloys of the type examined here [illegible]

NO REF SOV: 000 OTHER: 000 JPRS

Card 4/4

L 9700-65 EWT(m)/EWP(k)/EWP(t) Pf-4 RAEM(t) MJW/JD/HM/WB
ACCESSION NR: AP4043203 S/0125/64/000/008/0031/0035

AUTHOR: Yagupol'skaya, L. N.; Grabin, V. F.; Zotova, L. N.

TITLE: Effect of aging at 70C on corrosion resistance of AMg6 alloy welded joints

SOURCE: Avtomaticheskaya svarka, no. 8, 1964, 31-35

TOPIC TAGS: AMg6 alloy, AMg6 alloy weld corrosion, AMg6 alloy weld property, AMg6 alloy intergranular corrosion, AMg6 alloy weld aging, AMg6 alloy corrosion susceptibility

ABSTRACT: The TIG welds of AMg6 alloy have been tested for corrosion behavior in a 3% NaCl + 1% HCl solution after being heat treated under different conditions. The welds either welded or annealed at 150C or 350C were not susceptible to intergranular corrosion. However, subsequent aging at 70C may render the welds susceptible to corrosion. For instance, a weld annealed at 150C for 10 hr becomes susceptible to [illegible] after 32 hr of aging at 70C. As-welded welds and welds [illegible] susceptibility to intergranular

for instance, a solid-annealed at 150C [illegible] corrosion after 32 hr of aging at 70C. As-welded welds and welds susceptibility to intergranular [illegible] at 150C for 2 hr develop corrosion after 100 hr or so. Thus weld heat treated at 150C are more susceptible to intergranular corrosion than those in a welded [illegible]

L 0700-65

ACCESSION NR: AP4043203

condition or annealed at 350C when operating at 70C. The most extensive corrosion occurs in weld heat treated at 150C and aged for 165 or 327 hr. [illegible] found to be associated with β-phase precipitation which begins after 50 hr of aging at 70C. Heat treatment [illegible] of β-phase at grain bound-

precipitation which begins ... at grain boundaries ... ment at 150C accelerates the precipitation of β-phase at grain boundaries. Orig. art. has: 3 figures.

ASSOCIATION: Institut elektrosvarki im. E. O. Patona AN UkrSSR (Electric Welding Institute AN UkrSSR)

SUBMITTED: ... ENCL: 00

SUB CODE: MM NO REF SOV: 009 OTHER: 002

L 04666-67 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/WB

ACC NR: AP6007107 SOURCE CODE: UR/0129/66/000/002/0029/0032

AUTHORS: Langer, N. A.; Yagupol'skaya, L. N.; Kakhovskiy, N. I.; Yushchenko, K. A.; Fartushnyy, V. G.; Chalyuk, G. I.

ORG: Institute of Electro-Welding im. Ye. O. Paton, AN UkrSSR (Institut elektrosvarki AN UkrSSR)

TITLE: Corrosion resistance of steel with low nickel content in aggressive media

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 2, 1966, 29-32

TOPIC TAGS: corrosion resistant alloy, stainless steel, chromium steel alloy, nickel containing alloy, molybdenum containing alloy

ABSTRACT: The effect of the chemical composition of stainless steel with low Ni content upon its corrosion resistance has been studied. The investigated steels were: OKh21N3T, OKh21N5T, OKh21N6M2T (I), Kh14G14N3T, and Kh17AG14. Corrosive media selected were: 0.5N iron chloride solution, 3% solution of sodium chloride, 20% nitric acid, and sea water. Steel I, which contains 21% Cr, 6% Ni, and 2% Mo, was found to be most resistant to pitting under the described conditions. In general, it was established that resistance of heterogeneous ferrito-austenitic stainless steel to pitting is secured by an increase in Cr content and the presence of Mo.

UDC: 669.14.018.84:621.785

Card 1/2

L 04666-67

ACC NR: AP6007107

Thus, it is possible to substitute for the chrome-nickel steels of Kh18N10T type by steels with a low Ni content in a variety of listed corrosive media. Orig. art. has: 3 tables and 3 figures.

SUB CODE: 11,07 SUBM DATE: none/ ORIG REF: 005/ OTH REF: 004

kh

Card 2/2

L 35871-66 EWT(m)/EWP(t)/ETI IJP(c) JH/JD/WW/JG/WB

ACC NR: AP6021486 SOURCE CODE: UR/0413/66/000/011/0128/0128

INVENTOR: Rabkin, D. M.; Yagupol'skaya, L. N.; Langer, N. A.; Dovbishchenko, I. V.; Nikitina, A. V.; Zotova, L. M.; Martynova, N. A.; Yelagin, V. I.; Ishchenko, A. Ya.; Bondar', V. V.

ORG: none

TITLE: Filler-wire for argon-shielded arc welding of aluminum. Class 49, No. 182487 [announced by the Electric Welding Institute im. Ye. O. Paton (Institut elektrosvarki)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 11, 1966, 128

TOPIC TAGS: welding, aluminum ~~welding~~, arc welding, argon, ~~shielded arc welding~~, welding wire, aluminum wire, ~~chromium containing wire~~, ~~zirconium containing wire~~, corrosion resistance, chromium containing alloy, zirconium containing alloy

ABSTRACT: This Author Certificate introduces a filler-wire for argon-shielded arc welding of aluminum. To improve the weld corrosion resistance, the wire contains 0.8—1.2% chromium and 0.7—1.2% zirconium. [ND]

SUB CODE: 11, 13 SUBM DATE: 25Dec63 ATD PRESS: 5036

Card 1/1 UDC: 621.791.753.93.042

LUTSKIY, A.Ye.; YAGUPOL'SKIY, L.M.; OBUKHOVA, Ye.M.

Participation of vacant d-orbitals of sulfur in a conjugation system. Part 1: Dipole moments of aryltrifluoromethyl sulfides, sulfoxides, sulfones, and aryltrifluoromethyl ethers. Zhur. ob. khim. 34 no.8:2641-2647 Ag '64. (MIRA 17:9)

1. Khar'kovskiy politekhnicheskiy institut im. V.I. Lenina i Institut organicheskoy khimii AN UkrSSR.

YAGUPOL'SKIY, L. M. PA 170T28

USSR/Chemistry - Photographic Sensitizers Nov 50

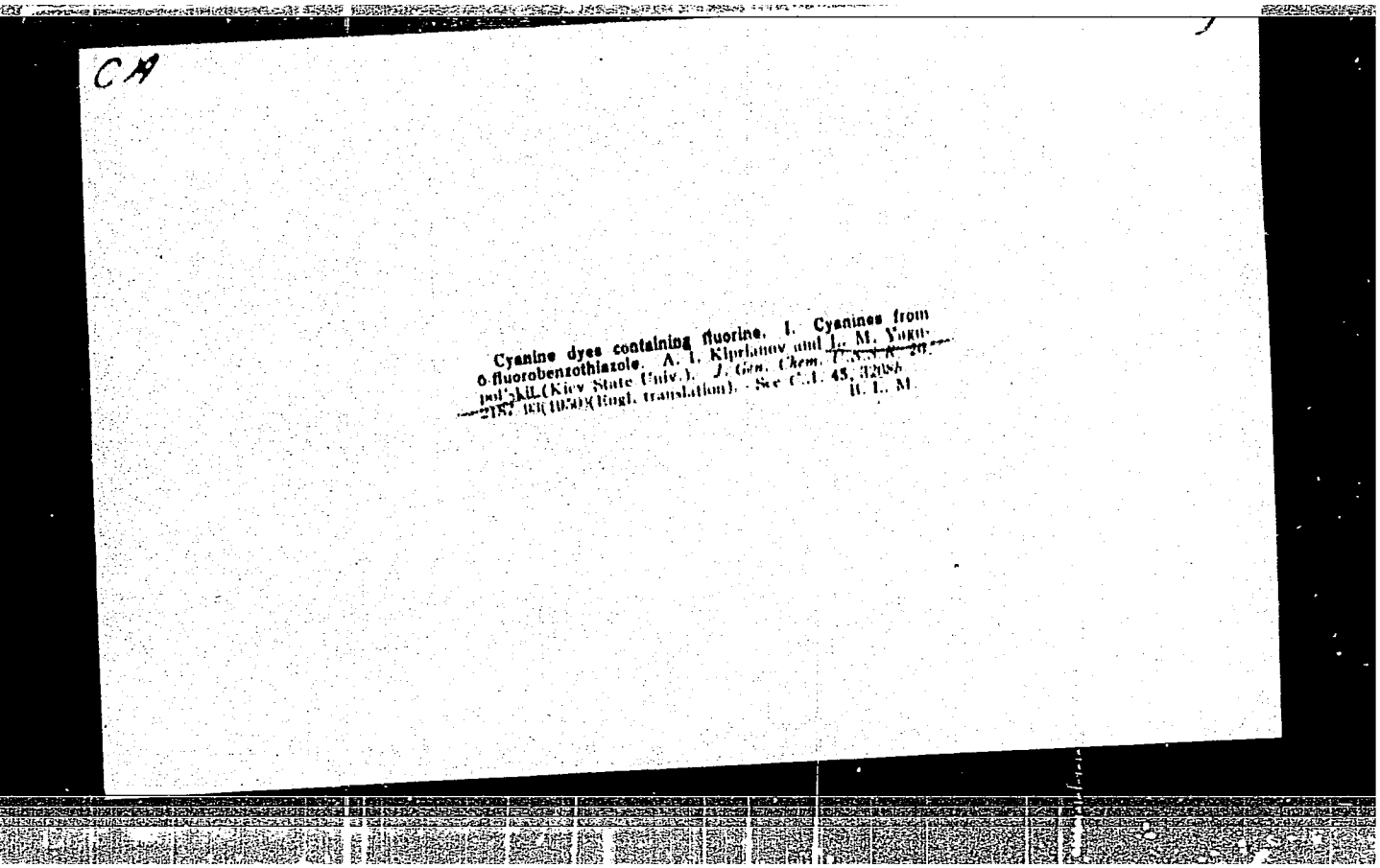
"Cyanin Dyes Containing Fluorine. I. Cyanin Dyes From Derivatives of 6-Fluorobenzothiazol," A. I. Kiprianov, L. M. Yagupol'skiy, Chair of Org Chem, Kiev State U

"Zhur Obshch Khim" Vol XX, No 11, pp 2111-2117

Synthesized 2-methyl-6-fluoro- and 2-methyl-mercapto-6-fluorobenzothiazols and their quaternary salts. Obtained 11 thiocyanin dyes containing F as substitute in position 6, 170T28

USSR/Chemistry - Photographic Sensitizers (Contd) Nov 50

in place of H. Showed this substitution has practically no effect on position of maximum absorption, as distinguished from Cl, Br, and I. 170T28



CA

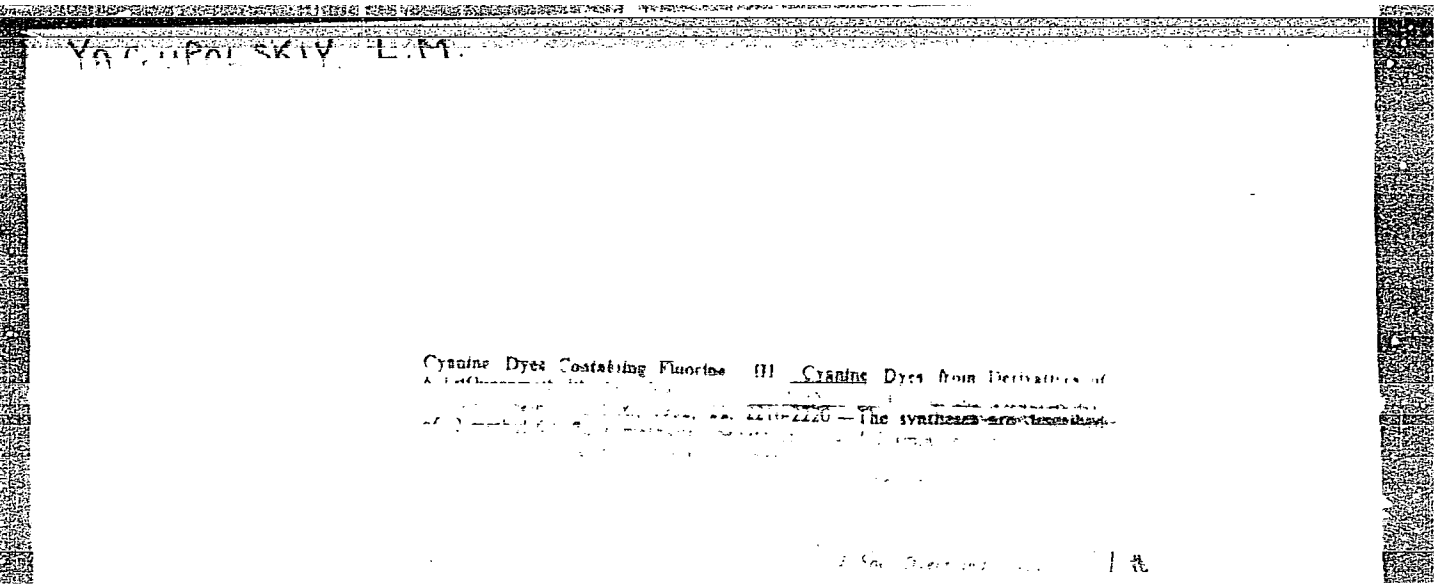
Cyanine dyes containing fluorine. I. Cyanines from 6-fluorobenzothiazole. A. I. Kiprianov and L. M. Yagupol'skii (Kiev State Univ.). J. Gen. Chem. [illegible] 28. 2187-[illegible] (Engl. translation). See C.A. 45, 3208h. H. L. M.

YAGUPOLSKII, L. M.

Cyanine Dyes Containing Fluorine. II. Cyanine Dyes from Derivatives of [illegible]

methylbenzthiazole, the syntheses of which are described [illegible]
thiacyanines and nine 5:5'-*bis*trifluoromethyl-thiacyanines are prepared, the internuclear chain being varied in length (1-7 methine or substituted methine groups). These 5:5'-substituted dyes, like the 6:6'-difluorothiacyanines, differ only slightly in their spectral characteristics from the unsubstituted compounds.

J. Soc. Dyers and Colourists.



Cyanine Dyes Containing Fluorine III. Cyanine Dyes from Derivatives of

[illegible] — The synthesis and [illegible]

fluorine in the one case in which the corresponding methylthio compound is known.
J. Soc. Dyers and Colourists.

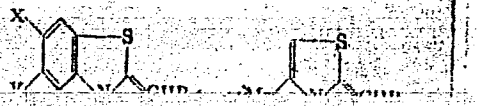
Cyanine dyes which contain fluorine. II. Cyanine dyes from derivatives of 5-fluoro- and 5-trifluoromethylbenzothiazole. I A. I. Kiprianov and L. M. Yagupol'skii. *J. Gen. Chem. U.S.S.R.* 22, 2267-72 (1952) (Engl. translation). See *C.A.* 47, 4760*f*. III. Cyanine dyes from derivatives of 6-(trifluoromethylthio)benzothiazole. L. M. Yagupol'skii and A. I. Kiprianov. *Ibid.* 2273-7. See *C.A.* 47, 4771*a*.
H. L. H.

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
Photography

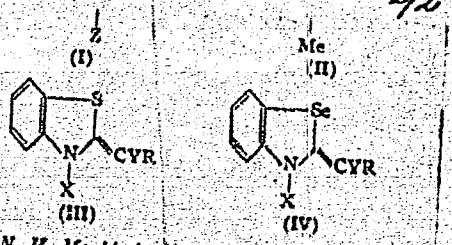
YAGUPOL'SKIY, L.M.

Chemical Abst.
Vol. 48
Apr. 10, 1954
Organic Chemistry

V Reaction of quaternary salts of heterocyclic compounds with aromatic nitrochloro compounds. L. M. Yagupol'skii and M. S. Marenets. *Zhur. Obshchei Khim.* 23, 481-8 (1953).—ClCH$_2$OCl (3.6 g.) in C$_6$H$_6$ treated with 3 g. o-EtNHC$_6$H$_4$SH in C$_6$H$_6$ with cooling yielded after 4 hrs. 70% *2-(chloromethyl)benzothiazole-EtCl*, decomp. 169–72° (from EtOH-Et$_2$O). Shaking 0.9 g. 2-methylbenzothiazole-MeSO$_4$ in 10 ml. H$_2$O with 15 ml. C$_6$H$_6$ and 0.6 g. NaOH, treating the dried org. layer with 0.4 g. picryl chloride 1 hr. on a steam bath filtering off the quaternary salt, and concg. the filtrate gave 42% *3-methyl-2-(picrylmethylene)benzothiazoline* (I), decomp. 202–3° (from C$_6$H$_6$-Et$_2$O), absorption max. 552 mμ, also obtained in 88% yield by coupling the above components in EtOH in the presence of Et$_3$N at room temp., and in an 82.3% yield with Me picryl sulfide instead of picryl chloride in the 2nd procedure, and in 79% yield with trinitroanisole instead of picryl chloride. 3-Methyl-6-nitro-2-methylenebenzothiazoline (0.5 g.) in PhNO$_2$ and 0.8 g. picryl chloride after 1.5 hrs. on a steam bath gave 61% black-green *3-Me deriv.* of I, decomp. 215°, absorption max. 535 mμ. Similarly 3-methyl-2-methylenenaphtho[2,1]thiazoline in C$_6$H$_6$ gave 56% *2-(picrylmethylene) analog*, black, decomp. 207–8°, absorption max. 560 mμ. 3-Methyl-2-methylenebenzothiazoline and 2,4-(O$_2$N)$_2$C$_6$H$_3$Cl refluxed in C$_6$H$_6$ 3 hrs. gave 20% *3-methyl-2-(2,4-dinitrophenylmethylene)benzothiazoline*, black, decomp. 243–4°, absorption max. 502 mμ; 4,3,5-Cl(O$_2$N)$_2$C$_6$H$_2$Cl$_2$ similarly gave 35% *2-[3,5-dinitro-4-(trifluoromethyl)phenylmethylene] analog*, black, m. 195–6°, absorption max. 510 mμ. Refluxing 3-ethyl-2-iminobenzothiazoline with picryl chloride in C$_6$H$_6$ 1 hr. gave *2-aminobenzothiazole-EtCl*, which was filtered off and the soln. concd., yielding 61.5% yellow *3-ethyl-2-(picrylimino)benzothiazoline*, m. 194° (from C$_6$H$_6$), absorption max. 410 mμ. The following dyes (I–IV) were prepd. directly from the quaternary salts (as described under the 1st example) (R = picryl, X, Y, Z, color, decompn. temp., yield (%), and absorption max. (mμ) shown):



Yagupol'skii, L. M. 2/2 (2)



I: Me_2N, *H*, *Me*, black, [illegible], 880; *SCF*$_3$, *H*, *Me*, bronze, 201–2°, 78, 550; *H*, *OEt*, *Me*, green, 201–2°, 81, 560; *H*, *CF*$_3$, *Me*, bronze, 209–10°, 83, 535; *H*, *H*, *Ph*, black, 204–5°, 79, 554. II: green, 189–90°, 82, 550. III: *Me*, *Me*, violet, 155–6°, 83, 605; *Me*, *Et*, violet, 153–4°, 83, 605; *Et*, *Me*, violet, 151–2°, 82, 610; *Et*, *Cl*, black, 144–7°, 60, 605. IV: *Me*, *H*, black, 202–3°, 45, 560; *Me*, *Me*, black, 155–6°, 39, 605. Thus electropos. groups in the benzene ring of benzothiazole the shift absorption max. to longer waves, and electroneg. groups cause an opposite shift. Replacement of H in the methine group by Me, Et, or Cl deepens the color of the dye, apparently because of steric hindrance, which prevents mol. planarity. G. M.

YAGUPOL'SKII L M

Reaction of quaternary salts of heterocyclic compounds with aromatic nitro chloro compounds. L. M. Yagupol'skii and M. S. Marenets. *J. Gen. Chem. U.S.S.R.* 23, 407–501 (1953) (Engl. translation).—See *C.A.* 48, 3904d.

H. I. H.

YAGUPOL'SKII L.

(2)

New synthesis of *o*-derivatives of benzotrifluoride. L. M. Yagupol'skiĭ and N. I. Man'ko. *Zhur. Obshchel Khim.* 23, 933–91(1953).—*o*-MeC_6H_4CN (20 g.) heated to 150° with illumination by a quartz lamp and treated with 17 g. Cl (added wt.; a temp. rise to 185° was observed) gave 86% *o*-$Cl_3CC_6H_4CN$, m. 94–5° (from EtOH), b_5 151–2°. This (20 g.) and 20 g. SbF_3 heated until a homogeneous soln. formed, distd., the distillate treated with Et_2O and 6*N* HCl, and the washed ext. distd. yielded 11.9 g. *o*-$F_3CC_6H_4CN$, b. 204–6°, m. 18° (cf. Roiche, *C.A.* 22, 2149). This (13 g.) reacted vigorously with 50 ml. 95% EtOH, 33 ml. 30% H_2O_2, and 5 ml. 6*N* NaOH (cooling to 40–50° was used); after standing overnight the mixt. was warmed 3 hrs. to 50°, cooled to 0°, and filtered, giving 11 g. *o*-$F_3CC_6H_4CONH_2$, m. 160–1°, with an addnl. 1.5 g. obtained on dilu. of the filtrate (cf. Brouwer, *C.A.* 24, 5294). This (8 g.) treated with a cold soln. of 10 g. NaOH in 80 ml. H_2O and 2.5 ml. Br, stirred and heated on a steam bath 45 min., cooled, and extd. with Et_2O, gave 4.9 g. *o*-$F_3CC_6H_4NH_2$, b_{18} 65–7°; *Ac deriv.*, m. 94–5°. The above benzamide (14.4 g.) in 72 ml. H_2O reacted vigorously with 36 ml. coned. H_2SO_4 and the soln. treated slowly with stirring with 12 g. $NaNO_2$ in H_2O at 98–100°, cooled, extd. with Et_2O, the ether soln. extd. with NaOH, and the aq. soln. acidified gave 91% *o*-$F_3CC_6H_4CO_2H$, m. 107–8°. The acyl chloride refluxed with EtOH gave the *Et ester*, b_{18} 90–1°, which, refluxed 3 hrs. with $N_2H_4.H_2O$ gave the *hydrazide*, m. 134° (from dil. EtOH). G. M. Kosolapoff

Inst. Org. Chem., Ukr. Ak. Sci.

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YAGUPOL'SKIY, L.M.

USSR.

New synthesis of o-derivatives of benzotrifluoride.

YAGUPOL'SKIY, L. M.
USSR/Chemistry

Card 1/1

Authors : Yagupol'skiy, L. M.; and Marenets, M. S.

Title : Phenyltrifluoromethylsulfides and phenyltrifluoromethylsulfones with substitutes in para-position

Periodical : Zhur. Ob. Khim. 24, Ed. 5, 887 - 894, May 1954

Abstract : The authors synthesized and described the properties of thirty phenyltrifluoromethylsulfide and phenyltrifluoromethylsulfone compounds containing SCF_3 and SO_2CF_3-groups as substitutes in the benzene nucleus. Substances containing the SCF_3-group were obtained through chlorination of the methyl group in p-nitrophenylmethylsulfide substitution of the chlorine atoms with fluorine with the aid of antimony trifluoride. Compounds containing the SO_2Cf_3-group were derived through oxidation of p-nitrophenyltrifluoromethyl sulfide with achromium mixture. Twelve references; 1 German since 1885. Table.

Institution: Acad. of Scs. Ukr-SSR, Institute of Organic Chemistry

Submitted : December 7, 1953

YAGUPOL'SKIY, L. M.

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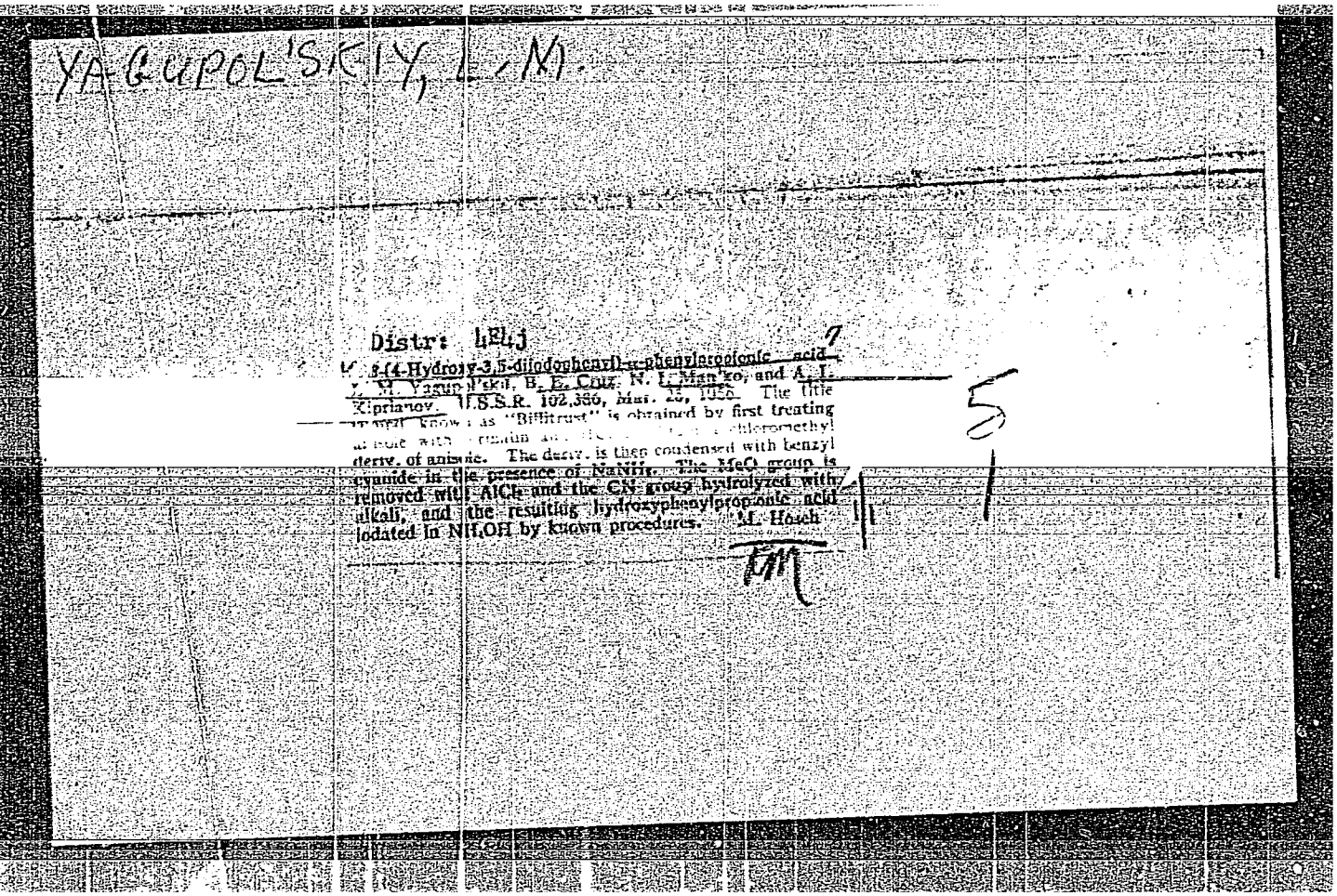
3 M.A.YOUTZ
3 copies

Cyanine dyes containing fluorine. IV. Cyanine dyes from derivatives of 5- and 6-trifluoromethylmercaptobenzothiazoles. L. M. Yagupol'skii and M. S. Marenets. *J. Gen. Chem. U.S.S.R.* 25, 1725–8(1955)(Engl. Translation). —See *C.A.* 50, 5035. B. M. R.



YAGUPOL'SKIY, L. M.

Distr: 4E4J

3-(4-Hydroxy-3,5-dijodophenyl)-α-phenylpropionic acid. L. M. Yagupol'skii, B. E. Cruz, N. I. Man'ko, and A. I. Kiprianov. U.S.S.R. 102,386, Mar. 20, 1956. The title compd. known as "Biiitrust" is obtained by first treating [illegible] with [illegible] chloromethyl deriv. of anisole. The deriv. is then condensed with benzyl cyanide in the presence of NaNH2. The MeO group is removed with AlCl3 and the CN group hydrolyzed with alkali, and the resulting hydroxyphenylpropionic acid iodated in NH4OH by known procedures. M. Hoch

YAGUPOL'SKIY, L M

USSR/Organic Chemistry - Synthetic Organic Chemistry, E-2

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61493

Author: Khaskin, I. G., Yagupol'skiy, L. M., Fialkov, Yu. A., Yakovleva, V. Ya., Vishnevskaya, G. I.

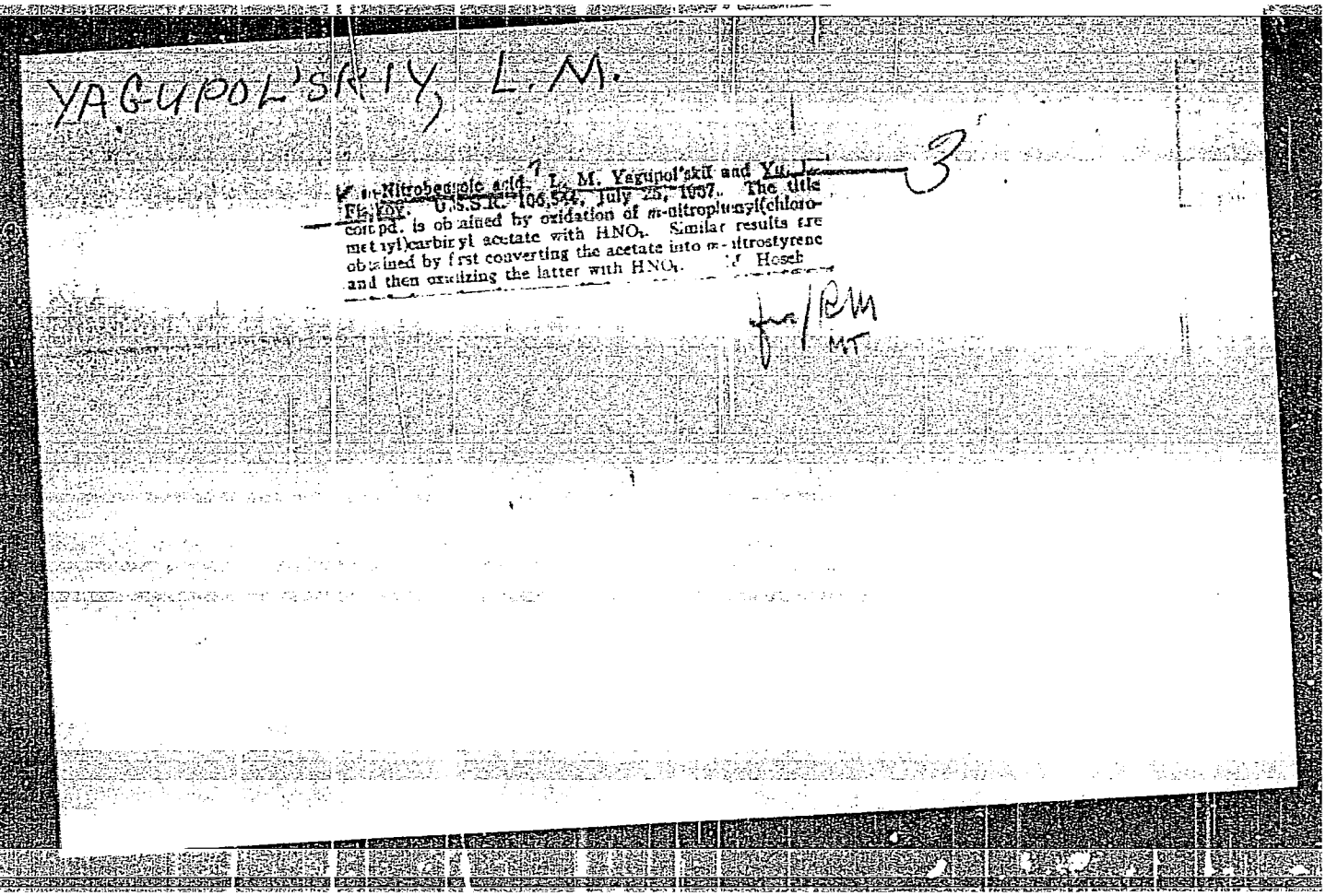
Institution: None

Title: On Preparation of 2-amino-1-p-nitro-phenylethanol

Original Periodical: Med. prom-st' SSSR, 1955, No 2, 30-32

Abstract: 2-amino-1-p-nitrophenylethanol (I) is obtained by simultaneous saponification and amination of the acetate of p-nitrophenyl-chloromethylcarbinol (II) with aqueous-methanol NH_3. 0.3 mol I 520 ml 26% NH_3 and 500 ml CH_3OH are heated in an autoclave (55°, 1.5 od m, 1.5 hours with stirring), boiled down in a flask to 1/3 of initial volume, cooled (40-50°) acidified with 27 g 80% CH_3COOH + 15 ml water. To the solution are added (after removal of tarry material) 45 ml 40% NaOH (15-18°) to an alkaline reaction, I is filtered off, washed with ice water, pressed; yield 82.5% (on the basis of II), MP 133-134° (from alcohol).

Card 1/1



YAGUPOL'SKIY, L. M.

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m-Nitrobenzoic acid. L. M. Yagupol'skii and Yu. [illegible]. U.S.S.R. 105,544, July 25, 1957. The title compd. is obtained by oxidation of m-nitrophenylchloromethylcarbinyl acetate with HNO_3. Similar results are obtained by first converting the acetate into m-nitrostyrene and then oxidizing the latter with HNO_3. [illegible] Hoseb

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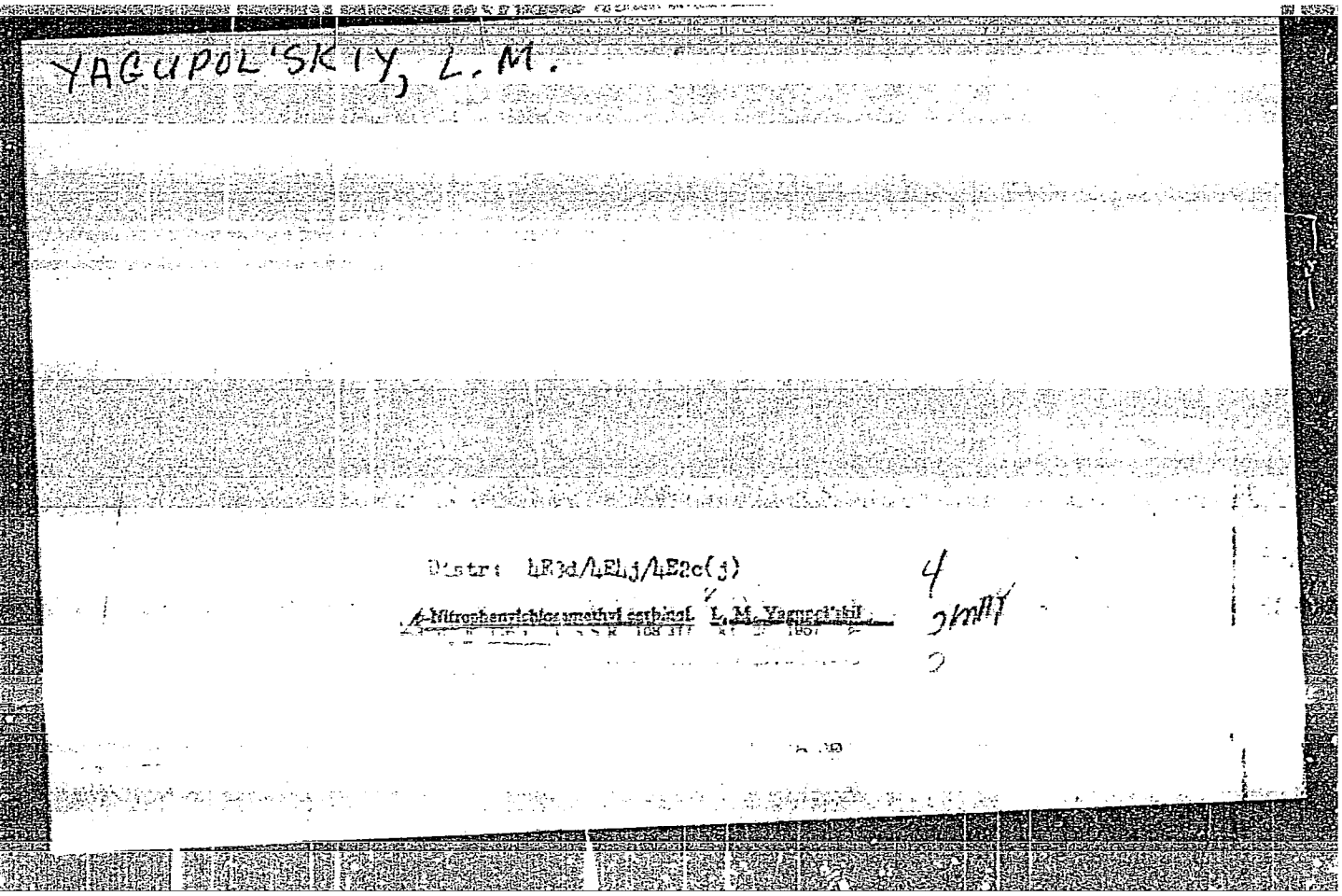

YAGUPOL'SKIY, L.M.

Distr: 4E3d/4E4j/4E2c(j)

4-Nitrophenylchloromethyl carbinol. L.M. Yagupol'skii 4

YAGUPOL'SKIY, L. M.

USSR/ Organic Chemistry - Synthetic organic chemistry E-2

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11797

Author : Yagupol'skiy L.M., Mospan V.S.
Title : Synthesis and Properties of Nitrophenols Containing a Trifluoromethyl Group

Orig Pub : Ukr. khim. zh., 1955, 21, No 1, 81-85

Abstract : For the purpose of studying the effect of nitrogroups on the stability of hydroxy benzotrifluorides toward alkaline hydrolysis there have been synthesized 3-nitro-4-hydroxy-benzotrifluoride (I) and 3,5-dinitro-4-hydroxy-benzotrifluoride (II) and it is shown that this stability increases in the series: $p\text{-}OHC_6H_4CF_3 < I < II$. I was synthesized in the following manner: by nitration of $p\text{-}ClC_6H_4CF_3$ was prepared 3-nitro-4-chlor-benzotrifluoride (III) (BP 81-83°/4 mm, 94-95°/10 mm). By heating with a 26% aqueous solution of NH_3, in a sealed tube, III was converted to 3-nitri-4-amino-benzotrifluoride (IV) (MP 109-110°). By decomposition of the diazonium salt of IV a 70% yield of I was obtained, BP 79°/5 mm, $n^{25}D$ 1.5024; p-nitobenzoyl derivative, MP 98-99°. By nitration of III under more drastic conditions there was obtained

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Inst. Org. Chem, AS UkrSSR

USSR/ Organic Chemistry - Synthetic organic chemistry E-2

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11797

3,5-dinitro-4-chlor-benzotrifluoride (V), yield 85%, MP 58°. On boiling of V with a saturated aqueous solution of soda, and on heating it at 180° with a mixture of CH_3COONa and CH_3CONH_2 it was possible to isolate only 3,5-dinitro-4-hydroxy-benzoic acid (VI). On heating V with a solution prepared by saturation of cold alcohol with NH_3, there is formed 3,5-dinitro-4-amino-benzotrifluoride (yield 91%, MP 143-144°). By the action of CH_3ONa on V was prepared 3,5-dinitro-4-methoxy-benzotrifluoride (yield 77%, MP 59-60°). II, MP 47-48°, was obtained with a yield of 64%, by nitration of I. On boiling of I with 10% solution of NaOH is formed 3-nitro-4-hydroxy-benzoic acid, MP 182°, while under the same conditions II yields VI with a melting point of 238°.

Card 2/2

YAGUPOL'SKIY, L.M.

INST. Hdqrs of Chem. Oil
Academy of Sciences
USSR

Cyanine dyes containing fluorine. IV. Cyanine dyes from derivatives of 5- and 6-trifluoromethylmercaptobenzothiazoles. L. M. Yagupol'skii and M. S. Marenets. *Zhur. Obshchei Khim.* 25, 1771–6(1955); cf. *C.A.* 48, 5000*d*; 49, 8172*e*.—Max. of absorption of thiacyanines with SCF_3 groups in 5,5'- and 6,6'-positions are displaced by 7–10 mμ to the long wave end of the spectrum in comparison with unsubstituted analogs. 3-Nitro-4-aminophenyl trifluoromethyl sulfide (15 g.) in 40 ml. concd. H_2SO_4 was treated with 60 ml. H_2O and 5.6 g. $NaNO_2$ in 10 ml. H_2O at 3–5°; the soln. after stirring 30 min. was filtered and added dropwise to a boiling soln. of CuBr with steam distn. of the product as soon as it was formed to yield *3-nitro-4-bromophenyl trifluoromethyl sulfide*, yellow oil, b. 121–3°. This boiled with alc. Na_2S and S 2 hrs. gave 70% *4,4'-bis(trifluoromethylmercapto)-2,2'-dinitrodiphenyl disulfide*, m. 133–4° (from AcOH). This in hot AcOH treated with Zn dust and concd. HCl, and then neutralized with NaOAc, gave a ppt. of the Zn salt, which heated 3 hrs. with Ac_2O and steam distd., gave 60% *2-methyl-5-trifluoromethylmercaptobenzothiazole* (I), m. 93–4° (from ligroine); treatment with *p*-$MeC_6H_4SO_3Et$ 4 hrs. at 150°, followed by aq. $NaClO_4$ gave the *ethoperchlorate*, m. 138–9°. Similarly was obtained the *ethoperchlorate* of *2-methyl-6-trifluoromethylmercaptobenzothiazole* (II), m. 153°. Heating I etho-*p*-toluenesulfonate and 2-methylmercaptobenzothiazole Et ethosulfate in EtOH-AcONa 45 min. gave 50% *[3-ethyl-5-trifluoromethylmercapto-2-benzothiazole][3-ethyl-2-benzothiazole]methinecyanine*, isolated as the perchlorate, yellow, m. 200–7°, abs. max. 430 mμ. Refluxing I ethoperchlorate with $HC(OEt)_3$ in pyridine 25 min. gave 61% *bis(3-ethyl-5-trifluoromethylmercapto-2-benzothiazole)trimethinecyanine*, isolated as the bronze perchlorate, m. 279–80°, abs. max. 560 mμ. Use of $MeC(OEt)_3$ with I etho-*p*-toluenesulfonate refluxed in pyridine with a little Ac_2O 45 min. gave 52% *bis(3-ethyl-5-trifluoromethylmercapto-*

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L. M. YUR-CHENKO

2-benzothiazole)-9-methyltrimethinecyanine perchlorate, blue-black, decomp. 255–6°, abs. max. 550 mμ. The use of EtC(OEt)$_3$ gave 33% *bis(3-ethyl-5-trifluoromethylmercapto-2-benzothiazole)-9-ethyltrimethinecyanine perchlorate*, decomp. 235–6°, abs. max. 555 mμ. I etho-*p*-toluenesulfonate refluxed with Ac_2O-pyridine with *β*-anilinoacrolein anil-HCl gave 45% *bis(3-ethyl-5-trifluoromethylmercapto-2-benzothiazole)pentamethinecyanine perchlorate*, decomp. 256–1°, abs. max. 658 mμ. I ethoperchlorate and *p*-$Me_2NC_6H_4CHO$ refluxed 0.5 hr. with Ac_2O gave 61% 2-(*p-dimethylamino*)-1-*styryl-5-trifluoromethylmercaptobenzothiazole*, isolated as the *ethoperchlorate*, m. 232–3°, abs. max. 545 mμ. II etho-*p*-toluenesulfonate refluxed in Ac_2O with HC(OEt)$_3$ 0.5 hr. gave 50% *bis(3-ethyl-6-trifluoromethylmercapto-2-benzothiazole)trimethinecyanine perchlorate*, decomp. 287–8°, abs. max. 568 mμ. The use of MeC(OEt)$_3$ in the reaction with pyridine-Ac_2O similarly gave 40% *bis(3-ethyl-6-trifluoromethylmercapto-2-benzothiazole)-9-methyltrimethinecyanine perchlorate*, decomp. 250–1°, abs. max. 555 mμ; EtC(OEt)$_3$ similarly gave 33% *bis(3-ethyl-6-trifluoromethylmercapto-2-benzothiazole)-9-ethyltrimethinecyanine perchlorate*, decomp. 220–1°, abs. max. 558 mμ. The reaction of II etho-*p*-toluenesulfonate with *β*-anilinoacrolein anil-HCl in Ac_2O-pyridine 0.5 hr. gave 40% *bis(3-ethyl-6-trifluoromethylmercapto-2-benzothiazole)pentamethinecyanine perchlorate*, decomp. 200–1°, abs. max. 665 mμ. G. M. Kosolapoff

YAGUPOL'SKIY, L.M.

Synthesis of some fluoro derivatives of phenazine, azobenzene and diphenylamine. V. P. Chernetskii, L. M. Yagupol'skii, and S. B. Serebryanyi. *Zhur. Obshchei Khim.* 25, 2161–70(1955).—Refluxing 13.6 g. $PhNO_2$, 11.1 g. *m*-$FC_6H_4NH_2$, 36 g. KOH, and 160 ml. C_6H_6 1 hr. gave, after steam distn. and extn. with 20% HCl, 6.6% *1-fluorophenazine*, m. 208–9°, and 1.7% *2-fluorophenazine*, m. 181–2°. Reaction of 14.1 g. *m*-$O_2NC_6H_4F$, 9.3 g. $PhNH_2$, and 23 g. KOH in C_6H_6 in 1 hr. gave 2.8% *1-fluorophenazine 10-oxide*, decomp. 220–5°, m. 203–4°; reduction of this gave *1-fluorophenazine*. Reaction of 24.6 g. $PhNO_2$, 11.1 g. *p*-$FC_6H_4NH_2$, and 36 g. KOH in C_6H_6 gave 0.78% *2-fluorophenazine*; in refluxing MePh there is formed 35–40% *2-hydroxyphenazine 10-oxide*, decomp. 254–6°. The diazonium fluoborate from 2-aminophenazine on thermal decompn. gave 1–10% *2-fluorophenazine*; however a 41% yield was obtained when 1.4 g. 2-nitro-4'-fluorodiphenylamine and 0.8 g. activated C were heated 5 min. at 250–300°, extd. with C_6H_6, and chromatographed on Al_2O_3. Treatment of 2 g. 2,3-$(H_2N)_2C_6H_3CF_3$ in Et_2O with *o*-benzoquinone in the presence of Na_2SO_4 gave in 2 days 4.6% 10.7% *2-trifluoromethylphenazine*, m. 125–6°. Similarly was prepd. formed in 47% yield on heating 2-nitro-3'-trifluoromethyldiphenylamine with C to 250–280°. Reaction of 16.3 g. *o*-$O_2NC_6H_4OMe$ with 11.1 g. *p*-$FC_6H_4NH_2$ and 20 g. KOH in C_6H_6 2 hrs. gave 2% *1-methoxy-7-fluorophenazine*, m. 148–

V. O. Chernetskii

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Reaction of 9.6 g. *o*-$O_2NC_6H_4CF_3$ with 4.66 g. $PhNH_2$, a trace of *1,7-dimethoxyphenazine*, 10 g. KOH in 60° and a trace of *1,7-dimethoxyphenazine 5-oxide*, g. *p*-$O_2NC_6H_4CF_3$ with 4.66 g. $PhNH_2$, a 10 g. KOH in C_6H_6 in 20 hrs. gave 1.1% *2-trifluoromethylphenazine 5-oxide*, m. 153°, decomp. 212–14°; reaction of $PhNO_2$ with 3-$CF_3C_6H_4NH_2$ and KOH similarly gave 1.4% *2-trifluoromethylphenazine 10-oxide*, m. 165–6°, decomp. 226°; reaction of $PhNO_2$ with 3-$CF_3C_6H_4NH_2$ and KOH gave some phenazine and *2-trifluoromethylphenazine*, m. 173–5°. The following products were obtained from similar reactions of the indicated reagents; $PhNO_2$ and *m*-$FC_6H_4NH_2$ gave 7.7% *3-fluoroazobenzene*, m. 47–8°, and 3.2% *3-fluoroazoxybenzene*, m. 33–4°; *m*-$FC_6H_4NO_2$ and $PhNH_2$ gave 23.2% *2-nitro-3'-fluorodiphenylamine*, m. 74–5°, and 5.4% *4-nitro-3'-fluorodiphenylamine*, m. 128–9°; $PhNO_2$ and *p*-$FC_6H_4NH_2$ gave 5.2% *2-nitro-3'-fluorodiphenylamine*, m. 82–3°, and 4-*nitro-4'-fluorodiphenylamine*, m. 191–2°; 2.1%, as well as a trace of *4-fluoroazobenzene*, m. 81–2°. *o*-$O_2NC_6H_4OMe$ and *p*-$FC_6H_4NH_2$ gave 1.4% *3-methoxy-4-nitro-4'-fluorodiphenylamine*, m. 141–2°; 5.3% *2-nitro-4'-fluorodiphenylamine*, m. 76–6°, and a little *2,2'-dimethoxyazoxybenzene*, m. 68–70°, 87–8°, as well as *2-methoxy-4'-fluoroazobenzene*, m. 63–70°, in 7.5% yield; $PhNO_2$ and *m*-$F_3CC_6H_4NH_2$ gave 3% *2-nitro-3'-trifluoromethyldiphenylamine*, m. 60–2°, 3% *4-nitro-3'-trifluoromethyldiphenylamine*, m. 145°, 5.3% *3-trifluoromethylazobenzene*, m. 37°, and 2.3% *azoxybenzene*, m. 72–5°.

G. M. Kosolapoff

YAGUPOL'SKIY, L.M.

Synthesis of derivatives of phenyl trifluoromethyl ether. L. M. Yagupol'skiĭ. (Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 105, 100–2 (1955).—4-ClC_6H_4OMe (142.6 g.) added to 10.4 g. PCl_5 followed by introduction of dry Cl at 190–200° 6 hrs. and distn. gave 77% *p*-$ClC_6H_4OCCl_3$, b_{16} 132–3°, b_4 119–20°, n_D^{20} 1.552, d_{20} 1.5. Prepd. similarly were: 69% *2*-$ClC_6H_4OCCl_3$, b_{10} 120–2°, n_D^{20} 1.5555, d_{20} 1.5036; 66% *4*-$FC_6H_4OCCl_3$, b_{10} 90–2°, n_D^{20} 1.5190, d_{20} 1.4707; 70% *2,4*-$Cl_2C_6H_3OCCl_3$, b_{10} 125–7°; 50% *p*-$NCC_6H_4OCCl_3$, b_4 140–1°; 83% *p*-$CCl_3OC_6H_4COCl$, b_4 138–9°. *p*-$ClC_6H_4OCCl_3$ (123 g.) added to 107.4 g. SbF_3, and 10.7 g. $SbCl_5$ (vigorous reaction) after brief refluxing, distn. gave 80% *p*-$ClC_6H_4OCF_3$, b. 141–2°, n_D^{20} 1.4359, d_{20} 1.3679. Obtained similarly were: 40% *2*-$ClC_6H_4OCF_3$, b. 142–3°, 1.4375, 1.369; 58% *4*-$FC_6H_4OCF_3$, b. 104–5°, 1.3930, 1.323; 20% *2,4*-$Cl_2C_6H_3OCF_3$, b. 170–2°, 1.4615, 1.403; 20% *4*-$NCC_6H_4OCF_3$, b. 192–3°; 60% *p*-$FCOC_6H_4OCF_3$, b. 101–3° (amide, m. 155–6°, free acid, m. 150–1°, Et ester, b. 207–8°). KOH (33 g.) in 280 ml. H_2O added at 0° to 4.9 ml. Br followed by 4-$CF_3OC_6H_4CONH_2$, left 20 min. at 75–80°, the product steam distd. yielded 70% *4*-$H_2NC_6H_4OCF_3$, b_{16} 73–5°, Ac deriv., m. 114–15°. Diazotization of the amine and treatment with H_3PO_2 gave 58% $PhOCF_3$, b. 102°, n_D^{20} 1.4050, d_{20} 1.2263.

G. M. Kosolapoff

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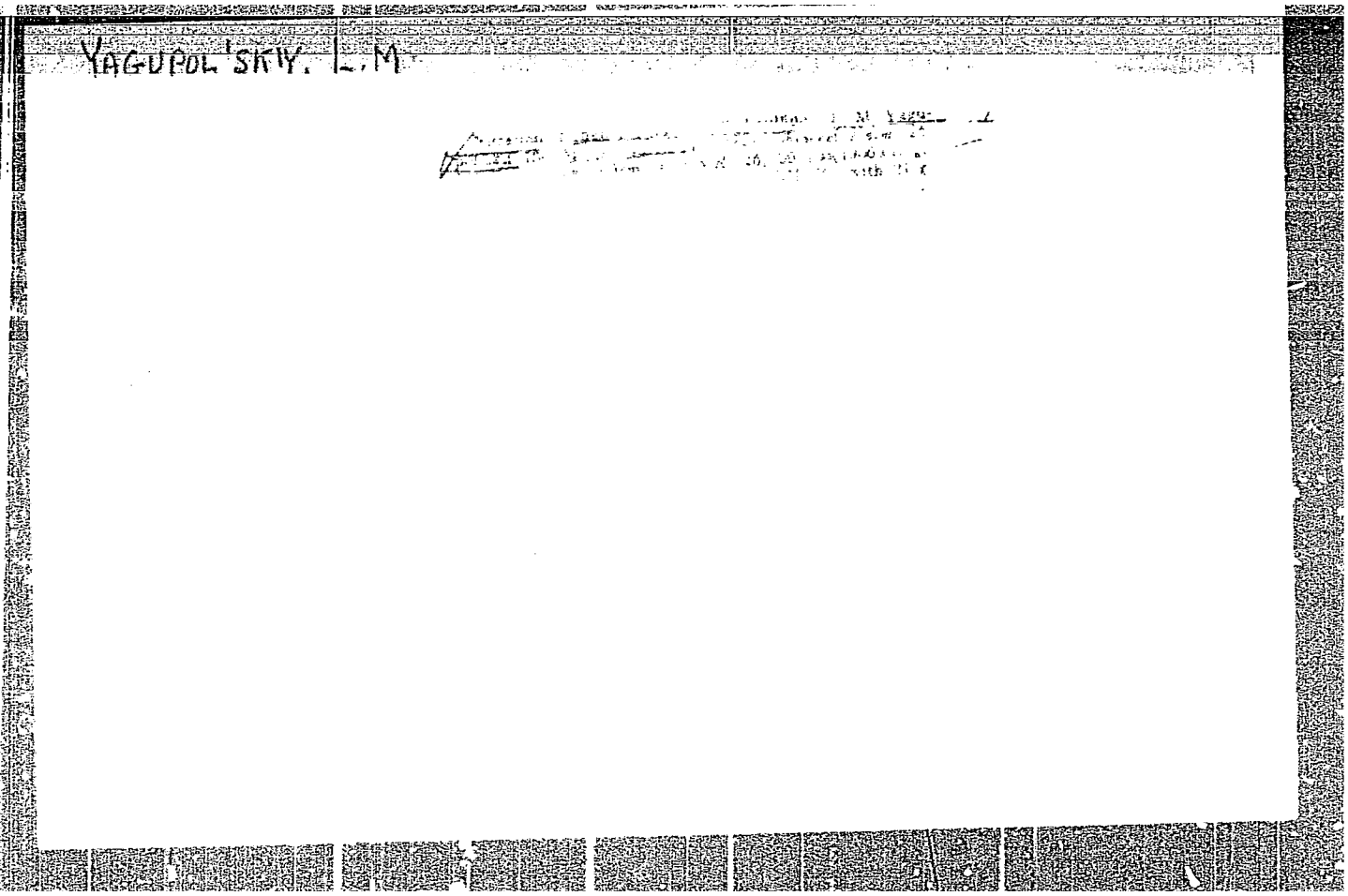
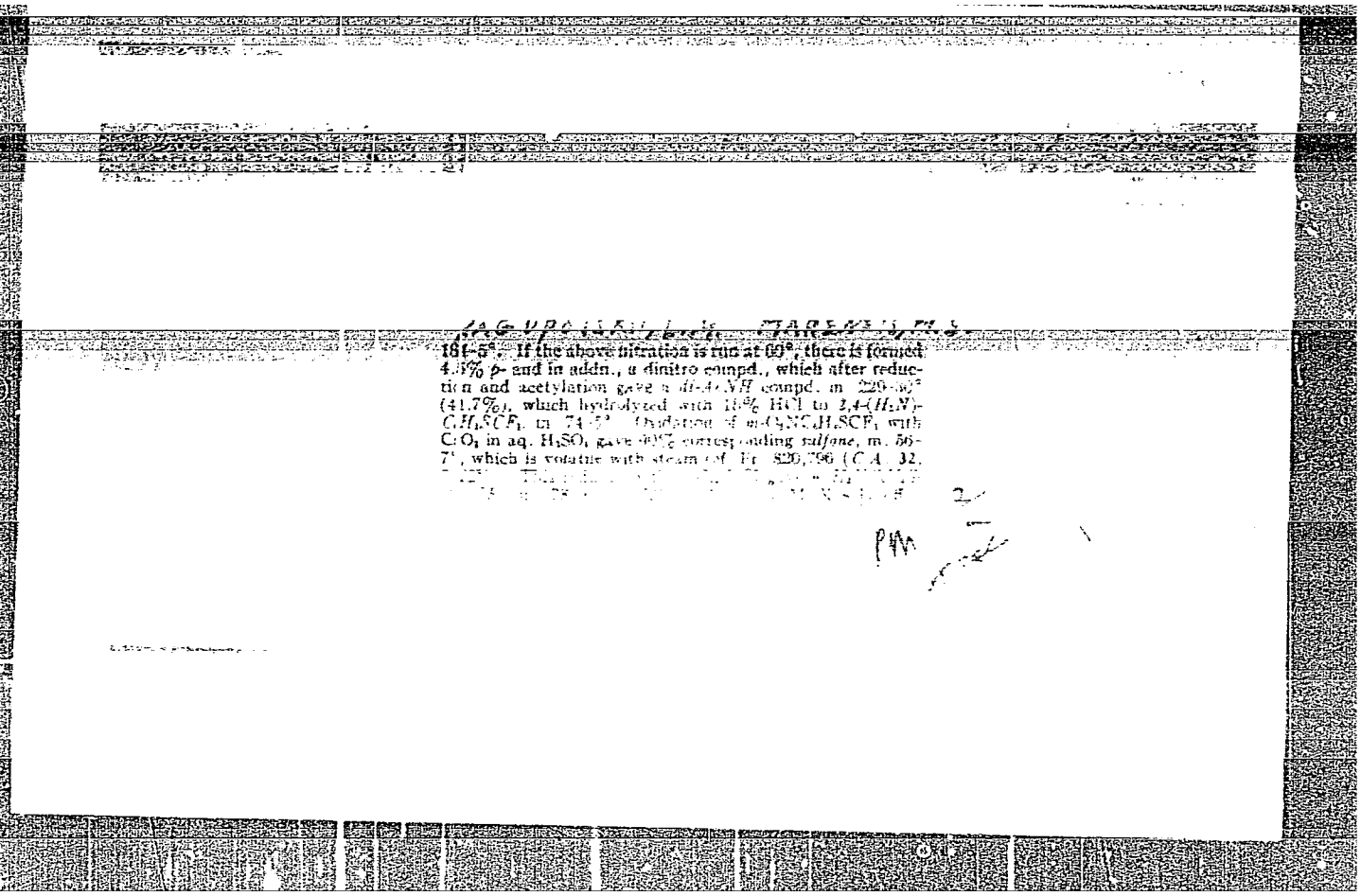
YAGUPOL'SKIY, L.M.





181–5°. If the above nitration is run at 60°, there is formed 4.8% *p*- and in addn., a dinitro compd., which after reduction and acetylation gave a *di-Ac*NH compd. m. 220–6° (41.7%), which hydrolyzed with 18% HCl to *2,4-*(H_2N)$C_6H_3SCF_3$, m. 74–5°. Oxidation of *m*-$O_2NC_6H_3SCF_3$ with CrO_3 in aq. H_2SO_4 gave 40% corresponding *sulfone*, m. 56–7°, which is volatile with steam (cf. Fr. 820,796 (*C.A.* 32,

YAGUPOL'SKIY, L.M.

YAGUPOL'SKIY, L.M.; GRUZ, B.Ye.

Synthesis of nitrophenylhydrazines containing a trifluormethyl group. Ukr. khim. zhur. 23 no.5:634-636 '57. (MLRA 10:11)

1. Institut organicheskoy khimii AN USSR.
(Hydrazine) (Methyl group)

AUTHORS: Yagupol'skiy, L. M. and Troitskaya, V. I. 79-2-52/58

TITLE: Cyanine Dyes Containing Fluorine. Part 5. Synthesis of Cyanine Dyes from 5- and 6-Trifluoromethyoxy-Benzthiazoles (Tsianinovyye krasiteli soderzhashchiye ftor. V. Sintez tsianinovykh krasiteley iz 5- i 6-triftormetoksibenztiazolov)

PERIODICAL: Zhurnal Obshchey Khimii, 1957, vol 27, No 2, pp. 518-526 (U.S.S.R.)

ABSTRACT: In order to determine the effect of fluorine containing substitutes on the color and effectiveness of photo sensitizers, the authors synthesized 2-methyl-5- and 2-methyl-6-trifluoromethoxybenzthiazoles and derived a number of thiacarbocyanines from these bases. The entire synthesis process is described. From the quaternary salts of the benzthiazoles 8 thiacarbocyanines (with the trifluoromethoxy groups in positions 5 and 6 of the benzthiazole ring) were obtained. An effort to saponify the OCF_3-group in these compounds by heating with a 50% hydrobromic acid to 150° in a sealed flask yielded no result; the product remained unchanged. Boiling of the alcohol solution of the nitrochloro mixture with an alcohol sodium disulfide solution formed disulfide (small amounts). This proves that the main product obtained from the nitration of 4-chlorophenyltrifluoromethyl ether is an

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Cyanine Dyes Containing Fluorine. Part . Synthesis of Cyanine Dyes from 5- and 6-Trifluoromethyoxy-Benzthiazoles

isomer according to chemical formula (1). It was found that the adsorption maxima of thiacarboncyanines with the OCF_3 substitute are no different from the absorption maxima of nonsubstituted dyes.

1 table. There are 5 references, of which 3 are Slavic

ASSOCIATION: Academy of Sciences of Ukrainian -SSR, Institute of Organic Chemistry

PRESENTED BY:

SUBMITTED: March 13, 1956

AVAILABLE: Library of Congress

YAGUPOL'SKIY, L. M.

Derivatives of ... containing ...

$H_2NC_6H_4SeMe$, b. 105-5°; Ac deriv., m. 96-100°. Azo coupling of appropriate amines with Me_2NPh gave the following p-$Me_2NC_6H_4N:NC_6H_4R$ (R, % yield, m.p., and λ (mμ) given): p-MeS, 83, 175-6°, 420; p-CF_3S, 10, 169-70°, 432; p-$MeSO_2$, 60, 223-4°, 445; p-CF_3SO_2, 32, 175-6°, 476; p-CF_3O, 75, 131-2°, 419; p-CF_3, 70, 175°, 430; p-MeSe, 60, 175-6°, 420; o-CF_3, 60, 120°, 425. Spectra in EtOH and in alc. HCl are discussed. The F-bearing derivs. show a shift of absorption to shorter wavelengths.

G. M. Kosolapoff

YAGUPOL'SKIY, L. M.

Distr: 4E4j/4E2a(j)/4E3d

Fluoro derivatives of acenaphthene. I. L. M. Yagupol'skii and Zh. M. Ivanova. Zhur. Obshch. Khim. 27, 2215-9 (1957).—Diazotization of 46 g. 1-aminoacenaphthene in aq. HCl and treatment with HBF4 from 33.4 g. H_3BO_3 and 107.5 g. 40% HF gave green diazonium fluoborate, decomp. 122–8°, which on pyrolysis gave 37.8% *1-fluoroacenaphthene* (I), m. 64–5°; picrate, m. 162–3°. Similarly, 2-aminoacenaphthene gave 77% *2-fluoroacenaphthene*, m. 95–6°; *picrate*, m. 137–8°, while 3-aminoacenaphthene gave 18.8% *3-fluoroacenaphthene*, m. 57–8°. Oxidation of I with AcOH-$Na_2Cr_2O_7$ gave after the usual treatment 57% *4-fluoronaphthalic anhydride*, m. 220–1°, after drying at 140°; treatment with NaOH-Me_2SO_4 gave the *di-Me ester*, m. 108–9°. Similarly was obtained 46% *3-fluoronaphthalic anhydride*, m. 234–5°. I (2 g.) and 1.5 ml. SO_2Cl_2 kept overnight gave 58.3% *4-chloro-5-fluoroacenaphthene*, m. 125–6°. Treatment of 9.42 g. 4-chloroacenaphthene with 60 ml. AcOH followed by 7.5 ml. HNO_3 (d. 1.5) and 7.5 ml. AcOH at 15° and the mixt. kept 0.5 hr. at 10° gave 33.4% *4-chloro-5-nitroacenaphthene*, m. 136–7°, which reduced with $SnCl_2$-HCl to 47.5% *4-chloro-5-aminoacenaphthene*, m. 142–4° (Ac deriv., m. 185–6°), which yielded 64% corresponding *diazonium fluoborate*, decomp. 131–2°, which gave 12.7% *4-chloro-5-fluoroacenaphthene*, m. 124–6°, identical with above described.

G. M. Kosolapoff

AUTHORS: Yagupol'skiy, L. M., Belinskaya, R. V. 79-28 3-46/61

TITLE: The Synthesis of Phenyldifluoroacetic Acid and Its Derivatives (Sintez fenildiftoruksusnoy kisloty i yeye proizvodnykh)

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 3, pp. 772-775 (USSR)

ABSTRACT: The derivatives of phenylacetic acid were investigated in detail as many of them are physiologically active bodies with the capability of accelerating the growth of plants (reference 1). The authors intended to carry out the synthesis of phenyldifluoroacetic acid and of its derivatives not mentioned in publications. For this purpose they began with the reaction of the nitrile of phenyldichloroacetic acid with antimony trifluoride. The benzylcyanide was used as initial product. It was chlorinated according to Claisen (reference 2) with sulfurylchloride (reference 2) and then fluorized with antimony trifluoride. Here it was observed that the cyano-group was not effected and was not substituted by fluorine. The reaction takes place according to the following reaction scheme:

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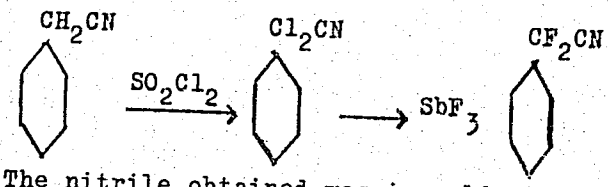
The Synthesis of Phenyldifluoroacetic Acid and Its Derivatives 79-28 3-46/61



The nitrile obtained was in cold state converted to the amide by the action of concentrated sulfuric acid; this amide furnished the phenyldifluoroacetic acid when heated with 10% potash lye. When this acid is nitrated the m-nitrophenyldifluoroacetic acid is formed. These two acids are rather strong. In the reaction of the nitro compound the m-amino derivative was obtained. The silvery salt of phenyldifluoroacetic acid reacts with iodine in a peculiar way forming ω,ω-difluorobenzylester of phenyldifluoroacetic acid according to the mentioned scheme 2. The experiments to form this reaction in another way to obtain phenyldifluoroiodomethane were not successful. There are 2 references, 1 of which is Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskiy SSR (Institute for Organic Chemistry AS Ukrainskoy, AS UkrSSR)

SUBMITTED: February 21, 1957

Card 2/2

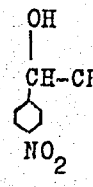
30Y79-28-6-38/63

AUTHORS: Yagupol'skiy, L. M., Gruz, B. Ye., Kiprianov, A. I.

TITLE: The Synthesis of p-Nitrophenylhalogenmethylcarbinols (Sintez p--nitrofenilgaloidmetilkarbinolov)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol. 28, Nr 6, pp. 1608-1610 (USSR)

ABSTRACT: p-nitrophenylhalogenmethylcarbinols are intermediate products in the synthesis of the synthetic antibiotics of synthomycin (sintomitsin). The synthesis of p-nitrophenylchloromethyl-carbinol (I) was first carried out from styrene by V. A. Mikhalev and co-workers. The chlorohydrin of styrene was acetylated, the acetyl derivative was nitrated, the p-isomer was separated from the obtained mixture of nitro products and was saponified to the compound (I). It was of interest to the authors to carry out directly the nitrification of chlorohydrin styrene. They found that on the addition of this compound to the nitrification mixture at a temperature not above 0° nitrogen ether of the m- and p-nitrophenylchloro-



(I)

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methylcarbinols form (Ref 2). The nitrogen ether of the p-nitro derivative was separated from the mixture by crystallization. In order to check the structure this product was oxidized with permanganate to p-nitrobenzoic acid and was identified with the above mentioned product (I) by Mikhalev; the structure of the m-isomer was determined in an analogous way. For the synthesis of p-nitrophenylchloromethylcarbinol it was necessary to saponify the nitrogen ether, which, according to existing data in publications, was expected to be very difficult. A perfect saponification (90 % yield) to carbinol was achieved by the authors only by heating the above mentioned ether with a great excess of concentrated hydrochloric acid. They further found that it is useful to take a mixture of hydrochloric and phosphoric acid, in which case a complete saponification is achieved with a much smaller amount of acid. As a peculiar fact, the saponification does not take place with phosphoric acid alone. Besides the mentioned methods of saponification also others were found: The heating of nitrogen ether with 60 - 65 % of sulfuric acid in the presence of urea yields the carbinol in a yield of 95 %. Concluding it can be said that the meth-

The Synthesis of p-Nitrophenylhalogenmethylcarbinols SOV/79-28-6-38/63

od of the synthesis of p-nitrophenylchloromethylcarbinol and p-nitrophenylbromomethylcarbinol by nitrification of the corresponding halogenhydrin styrene, with subsequent saponification of the formed nitrogen ether was carried out. There are 7 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry, AS Ukr SSR)

SUBMITTED: May 31, 1957

1. Methanol--Synthesis

Card 3/3

AUTHORS: Yagupol'skiy, L. M., Yufa, P. A. SOV/79-28-10-49/60

TITLE: Reaction of Phenyl-Phosphorus Tetrachloride With Diazomethane (Vzaimodeystviye chetyrekhkhloristogo fenilfosfora s diazometanom)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 10, pp 2853 - 2856 (USSR)

ABSTRACT: The reaction, investigated according to reference 1, of the aliphatic diazo-compounds with phosphorus halogenides showed that phosphorus tri- and phosphorus pentachloride react with diazomethane at -60 to -40°. In the case of the former chloride, the reaction ends at the stage of the monoalkyl derivative, with the formation of chloro-methyl-phosphorus dichloride; with phosphorus penta chloride it continues up to the trialkyl derivative, trichloro-trimethyl phosphine. The investigation of the reaction of arylphosphorus tetrachloride with diazomethane suggested itself. It was found that phenyl-phosphorus tetrachloride reacts most readily with it at -40°. After hydrolysis, a ω ω'- dichloro-dimethyl-phenyl phosphine oxide was separated out.

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Reaction of Phenyl-Phosphorus Tetrachloride With Diazomethane

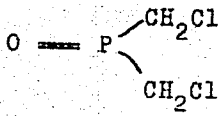
SOV/79-28-10-49/60

The reaction proceeds via the formation stage of ω,ω'-dichloro-dimethyl-phenyl phosphorus dichloride:

$$C_6H_5PCl_4 + 2CH_2N_2 \rightarrow N_2 + [C_6H_5P(CH_2Cl)_2Cl_2] \xrightarrow{H_2O} C_6H_5\overset{\overset{O}{\downarrow}}{P}(CH_2Cl)_2$$

(I)

Compound (I), separated out in colorless prisms, is difficultly soluble in water and benzene, and solves well in alcohol and acetone. Its chlorine atoms in the chloro methyl groups do not react easily. The nitrification of (I) is achieved by means of a nitrating mixture, the nitro group entering, according to Sandmeyer(Zandmeyyer), into the meta-position (Reaction pattern 2). The same end product (IV) can also be obtained by the counter-synthesis 3. Thus the group



appears as a meta-position orientated

Card 2/3 substituent. There are 3 references, 2 of which are Soviet.

Reaction of Phenyl-Phosphorus Tetrachloride With Diazomethane

SOV/79-28-10-49/60

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry at the AS UkrSSR)

SUBMITTED: July 30, 1957

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